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ABSTRACT

A 9-month longitudinal study of two kindergarten classes compared two types of music instruction: a Kodaly-based developmental music program and a traditional public school music program. The class taught through the Kodaly method received instruction that emphasized the development of rhythmic and melodic perception through visual, aural, and kinesthetic means. Traditional instruction did not include any consistent concern for perceptual or conceptual development. Findings indicated that both groups made significant gains in the areas of pitch and rhythmic discrimination. There was no significant difference between groups for tonal or rhythmic measures. However, data revealed that pupils from the Kodaly class could pitch-match and echo-clap better than students in the traditional class. Qualitative data revealed a rich contrast between the classes in philosophies, teaching styles, and teacher-pupil interactions. Both teachers fostered the development of aesthetic musical experience and instilled a love of music in the children. Findings suggest that further research combining quantitative and ethnographic methods is needed to learn more about the effects of teaching styles on rhythmic and melodic discrimination. A total of 62 references are cited. Related materials and correlation matrices are appended. (RH)

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A COMPARATIVE STUDY OF A KODALY-BASED DEVELOPMENTAL MUSIC PROGRAM AND A TRADITIONAL PUBLIC SCHOOL MUSIC PROGRAM AT THE KINDERGARTEN LEVEL

by

Rodger James Beatty

A thesis submitted to the Faculty of Education
in conformity with the requirements for the
degree of Master of Education

Queen's University
Kingston, Ontario, Canada
August, 1989

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ABSTRACT

The purpose of this exploratory study was to compare two types of music instruction at the kindergarten level: a Kodaly-based developmental music program and a traditional public school music program. The nine month longitudinal study involved two intact kindergarten classes, similar in terms of sex and socioeconomic level. One group received music instruction that emphasized development of rhythmic and melodic perception through visual, aural, and kinesthetic means (Kodaly method) while the other group received traditional music instruction without consistent concern for perceptual or conceptual development. Measures of auditory discrimination of rhythm and pitch, and performance skills of pitch matching and echo clapping were compared. In addition, two observation teams recorded classroom events in each of the two classes. The data from the two groups were compared through computation of means, standard deviations and analysis of variance. To measure the effect of group in the posttest scores while controlling for pretest differences, a multiple linear regression was computed with pretest and group as predictors. The Pearson product-moment correlation coefficients were computed to determine the linear relationship between any of the variables. The results showed that both groups demonstrated significant gain in the areas of pitch and rhythmic discrimination. There was no significant difference between the groups for either the tonal or rhythmic measures. However, the results revealed that the pupils from the Kodaly-based music instruction could pitch match and echo clap significantly better than the students from the traditional music program and that they were more of a homogenous group. In addition, the qualitative data revealed a rich contrast in the philosophies, teaching styles, and teacher-pupil interactions within each of the kindergarten classrooms. Nevertheless, both teachers fostered the development of aesthetic musical experience and instilled a love of music in the children. The results of the study suggest that kindergarten pupils who study music through a Kodaly-based developmental program develop better pitch matching skills and echo clapping skills than students who study music in a traditional music program. The findings suggest further research combining quantitative and ethnographic methods is needed to learn more about the effects of teaching styles on rhythmic and melodic discrimination.

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CHAPTER 1

RATIONALE AND RESEARCH QUESTIONS

In doing we learn.

George Herbert,
Jacula Prudentum

The Rationale

The early school music experiences of children are critical to their later understanding and enjoyment of music (Kodaly, 1974). It is at the kindergarten level that the very foundations for affective and cognitive development of the child are laid.

Music provides a rich setting for self expression and cognitive growth. Many researchers and educators believe music experiences, where self expression is encouraged, should begin during the child's developing years at the early elementary level. This is also the view of the Ontario Ministry of Education (1975):

> The arts have always held a central position in the community life of older cultures, both primitive and sophisticated. Our society has, on

> the other hand, tended to treat the arts less seriously, especially in the context of the young child's learning experiences. In the instances when [they] did receive attention, education in the arts focused on analytical study, imitation, or in the case of drama and music, performance. Only in recent years has the function of the individual imagination and self-expression through the arts been recognized as an important element in the child's learning.
>
> The arts are entwined with children's thinking and feeling and their creative development. The arts can provide many opportunities for growth, both in self expression and in the ability to respond to human emotions such as joy and sorrow, fear and wonder (p. 77).

Further, it should also be stressed that the arts are not merely an emotional outlet but each of the arts comprises a highly intricate and complexly organized discipline.

Methods of Music Teaching

Although music, as one of the arts, has been regarded as highly complex and structured in nature, the traditional early childhood classroom music program has customarily centred merely around the singing of songs and playing of singing games without systematic concern for perceptual or conceptual development. During the past three decades, North American educators have witnessed the introduction and development of various contemporary approaches to music education at the elementary school level. Zoltan Kodaly, Carl Orff, and Emile Jaques-Dalcroze have greatly influenced the educational philosophies of numerous music educators. As a result, we now see children experiencing music in different ways other than the traditional classroom music experience. In the Orff approach, children progress from speech patterns to rhythmic and movement activities and then to song. Children are encouraged to improvise vocally and instrumentally using an ensemble of percussion and stringed instruments. In the Dalcroze method, children study solfege for developing an acute ear for sound, they engage in improvisation to develop the capacity of free invention, and they participate in eurhythmics to develop a feeling of musical rhythm through bodily movements (Landis & Carder, 1972).

The Kodaly concept of music education is one method of teaching music that has received international awareness. The Kodaly method is based on singing, on the study of musical material of intrinsic value, both folk and composed, and on the application of relative solmization (Choksy, 1988). The Kodaly method first received international attention in 1958 at the International Society for Music Education (ISME) conference held in Vienna. Reports on the method were presented in Tokyo in 1963 and Zoltan Kodaly spoke to ISME delegates at the 1964 conference in Budapest. The international spread of the Kodaly method is evidenced as the method is presently being practiced in schools of Eastern and Western Europe, North and South America, Japan, Australia, New Zealand, and Iceland.

The Research Questions and Expected Results

The purpose of this exploratory study was to compare two types of music instruction at the kindergarten level: a Kodaly-based developmental music program and a traditional public school music program. The central research question addressed in this investigation was:

Do pupils who receive instruction through a Kodaly-based developmental music program discriminate and produce melody and rhythm better than those students who receive a traditional classroom music program? More specifically, do pupils who receive instruction through a Kodaly-based developmental music program have better developed auditory discrimination skills of rhythm and pitch and can they pitch match and echo clap significantly better than those students who receive a traditional classroom music program?

The study was designed to explore the effects of vocal music instruction from both teaching methods on the auditory discrimination and performance of rhythm and pitch of kindergarten children. One group received Kodaly-based music instruction that emphasized the development of rhythmic and melodic perception through visual, aural, and kinesthetic means while the other group received traditional music instruction without emphasis on perceptual and conceptual development.

To address the research questions, several measures were used. Data were collected by administration of pencil and paper and aural and kinesthetic pretests and postests. The measures included the tonal and rhythmic sections of the Primary

Measures of Music Audiation (Gordon, 1986), a 10-item investigator designed Pitch Matching Test, a 10-item investigator designed Echo Clapping Test and a short interview with each child. In addition, two observation teams recorded classroom events in each of the two classes. As singing and rhythmic activities have traditionally been integral parts of early elementary music programs, these measures were selected and designed for their appropriateness for both traditional and Kodaly-based music instructional groups.

It was expected that this study would demonstrate that pupils who studied music through a Kodaly-based program would be better able to discriminate melodic and rhythmic patterns than those students studying music in a traditional public school music program. Further, it was expected that pupils who studied music through a Kodaly-based program would be better able to pitch match and echo clap, that is, reproduce melodic and rhythmic patterns, than those students studying music in the traditional music program.

Summary

This chapter has delineated the rationale of the present study, outlined current methods of music teaching, and stated the research questions and the expected outcomes of the investigation. The review of the relevant literature follows in the succeeding chapter. This will be followed by a description of the method of the present study. Then, the results of the investigation will be reported. Finally, a discussion of the results and the implications for music education will be presented.

CHAPTER 2

REVIEW OF THE LITERATURE

> Books, we are told propose to instruct or to amuse. Indeed!... the true antithesis to knowledge, in this case, is not pleasure, but power. All that is literature seeks to communicate power; all that is not literature, to communicate knowledge.
>
> Thomas De Quincey,
> Letters to a Young Man

There are many aspects of the current literature that have bearing on the scope of the present thesis. This chapter first introduces the Kodaly concept of music education and selected studies comparing Kodaly-based instruction with more traditional programming. The pertinent literature dealing with early childhood music education follows. Then, a review of the literature concerning auditory perception, discrimination and performance abilities of rhythm and pitch ensues. Finally, relevant literature pertaining to ethnographic and qualitative designs are reviewed.

During the last thirty years North American educators have observed the introduction and growth of diverse structured developmental methods of music education at the elementary school level. Zoltan Kodaly, Carl Orff, and Emile Jaques-Dalcroze have considerably affected the educational philosophies of numerous music educators; we see children experiencing music in different ways other than the traditional classroom music experience. The traditional classroom music experience refers to music instruction based on the singing of songs and playing of singing games without systematic concern for perceptual or conceptual development. One contemporary approach to music education that has undergone great international growth is the Kodaly concept of music education. The focus of this work will be the Kodaly method of music education.

The Kodaly Concept of Music Education

The Kodaly concept is an approach to music education developed in Hungary under the guidance of Zoltan Kodaly. It first received worldwide attention at the International Society for Music Education conference in 1958. The method is based on singing, on the study of musical material of intrinsic value, both folk and composed, and on the use of relative solmization.

> Its objectives are twofold: to aid in the well-balanced social and artistic development of the child, and to produce the musically literate adult - literate in the fullest sense of being able to look at a musical score and think sound, to read and write music as easily as words (Choksy, 1988, p. 11).

Kodaly incorporated three tools as the foundation for this eclectic method of music education: tonic sol-fa, French time names, and Curwen hand signs. Tonic sol-fa is an English movable-doh system of solmization developed by Sarah A. Glover and John Curwen. It is based on the movable-doh system of solmization originated by the eleventh century monk, Guido d'Arezzo (Choksy, 1988).

Rhythmic time names were adapted from a system of syllables used in French solfege. These speech cue syllables utilized for the purpose of reading rhythm express the duration of rhythm.

The Curwen hand signs developed by John Curwen in

1870 are incorporated into the contemporary Kodaly method with minor modification. The hand signs provide a visual representation in space of the high-low relationships of notes being sung.

The subject matter is arranged into patterns that Kodaly believed follow typical child abilities at various stages of growth. For example, in melody the first tones sung by young children are the falling third (soh-mi). The lah above is the next note that the young child can usually sing in tune. Numerous children's singing games and chants are based on these notes. The doh and re are added to complete the pentaton. The pentaton is one of the basic scales for most folk music in the western world and to some extent, in eastern cultures, as well. The difficult to pitch steps, fah and ti, are taught last, completing the diatonic major and minor scales.

Comparison of Kodaly-Based Music Instruction with Traditional Music Instruction

Several studies (Hoermann & Herbert, 1979; Hoermann & Herbert, 1981; Hurwitz, Wolff, Bortnick & Kokas, 1975; and Kokas, 1969) have suggested the extra-musical benefits of Kodaly-based music instruction over those with traditional music instruction.

In Hungary, where the Kodaly concept of music education originated, school teachers frequently stated that school children receiving daily Kodaly music education performed better in mathematics and reading and had better study habits than children who received less intensive music instruction. Further, it was indicated that the potential positive effect of Kodaly music instruction on visual observation, movement, spelling, and language learning (Kokas, 1969).

Hurwitz, Wolff, Bortnick, and Kokas (1975) studied some nonmusical effects of the Kodaly music curriculum in primary grade children. The study was designed to test the effect of a Kodaly-based music instruction on sequencing skills, spatial abilities and academic achievement patterns of normal American middle class primary grade children. Results indicated that the experimental group performed significantly better than the control group on four of the five spatial tasks, three of the five sensorimotor tapping tasks, and on the Metropolitan Achievement Test Primary I. However, the results of this study were based on a small sample of 40 children.

Hoermann and Herbert (1979) studied a Kodaly-based developmental programme of music education for primary school children in Australia. Analysis of normative data showed a significant mean score difference between the performance of the Kodaly group and that of children in the group where music had not been taught developmentally. The performance of the Kodaly group children was markedly superior in the visual perception tasks of copy and recall, in the auditory tasks of recall and reproduction of rhythmic sound patterns, in definition of word concept and particularly in awareness of body concept.

Hoermann and Herbert (1981) reported further results in supplemental research. In this investigation, the sample contained 488 children. The three schools of the experimental group were matched for size and socio-economic status with three schools of the control group. After six years of instruction, the Kodaly group and the traditional group were tested on eleven measures: Test of Learning Ability (TOLA) 4, TOLA 6, Paragraph Understanding, Spelling Test, and 5 measures in reading and mathematics from the Primary Evaluation Project (PEP) Tests. A multivariate analysis of the results showed a superiority of the Kodaly music group over the control group ($p < .01$). Children from the Kodaly group averaged a higher score on every one of the 11 measures.

The difference was significant on the test of Paragraph Understanding, the PEP test of reading comprehension, and two of the PEP mathematical tests dealing with the positional value of numerals and with geometric shapes. On five of the other measures the difference was significant at the .05 level. These measures included the TOLA 4, the analogies subtest of TOLA 6, Spelling Test, and the PEP mathematical tests concerning operations on counting and problem solving. These results suggest that children receiving Kodaly-based instruction may be advantaged in learning, related to reading and mathematics.

However, the results of this study have grave limitations. The investigation did not involve pretest to posttest relationships. As well, the research findings failed to indicate the degree of intercorrelation among the measures.

Further studies comparing Kodaly with traditional approaches have yielded results relative to musical knowledge (Bebeau, 1982; McDaniel, 1974; Zemke 1973). McDaniel (1974) studied the difference in musical achievement between students taught for eighteen lessons by the Kodaly method and students taught for eighteen lessons by the traditional method at the fourth grade level. The investigator reported that students in the Kodaly group demonstrated a significant gain in only one subtest measuring pitch recognition. Since significance was found in only one area, it could not be conclusively determined on the basis of this study that one method was better than the other. However, the short duration of eighteen lessons of the investigation greatly diminishes the validity of the results.

Zemke (1973) studied the effects of a Kodaly-adapted music instructional sequence and a more typical sequence on auditory musical achievement in fourth-grade students. The investigator found that Kodaly-adapted sequence led to greater gains in the development of auditory abilities than those afforded by more typically-oriented approaches. Among the many recommendations at the conclusion of this study, Zemke suggested further research into the differential effectiveness of the Kodaly approach and other approaches in relation to various levels in each of several dimensions of musical aptitude.

Bebeau (1982) studied the effects of traditional and simplified method of rhythmic reading instruction in third grade children. The investigator recounted that music educators understandably delay the teaching of rhythmic reading until children have acquired the necessary mathematical concepts to answer questions such as: "If a song is in common time, how many counts will the whole note get?" Bebeau designed a simplified speech cue method of rhythmic time names adapted from Kodaly and Orff models. For example, for the rhythmic pattern of two eighth notes and one quarter note, the Kodaly method would use rhythmic time names "ti-ti ta"; the Orff method would use a speech chant such as "bub-ble gum" while Bebeau created "ta-ta tahn". Bebeau reported that the speech cue group made significantly greater gains than the traditional group. These results suggest that use of a simplified speech cue like the Kodaly rhythmic time names may be advantageous in the teaching of rhythmic reading.

While much of the relevant research of Kodaly-based music programming investigates the merits and strengths of learning music through a Kodaly-based method in comparison to music training of other traditional approaches, most studies have examined the benefits of the Kodaly method with late primary or junior age children. As the musical development of the child begins at an early age, it is important to review relevant literature of early childhood music education, even though there is little literature relating specifically to the Kodaly method for these younger children.

Early Childhood Music Education

Numerous educators and researchers have studied musical development in early childhood (e.g. Apfelstadt, 1984; Boardman, 1964; De Yarman, 1971; Drexler, 1938; Geringer, 1983; Gilbert, 1980; Greenburg, 1976; Jetter, 1980; Klanderman, 1979; McDowell, 1974; Rainbow, 1977; Rainbow, 1981; Simons, 1964; Simons, 1968; Smith, 1961; Tapley, 1976; Webster & Schlentrich, 1982; Young, 1982; Zimmerman, 1984; Zwissler, 1972).

Greenburg (1976), in a review of the existing research on preschool music education, found critical gaps in our knowledge of the young child and his/her acquisition of tonal and rhythmic concepts in music. He also found evaluation techniques to measure musical growth at the preschool stage were at a primitive level. Techniques of providing test materials for the young child continued to pose problems for researchers. This was also the case in the present study.

The surrounding environment in which a child grows and matures will affect the musical development of the young child. Simons (1968), in a study of incipient musical responses among very young twins and singletons, concluded that the control of musical experiences within the environment of the young child will shape the musical development of the child.

Since the musical experiences of the preschool child have a demonstrated effect on the musical development of the child, researchers have studied the problem of how to measure musical concept development in early childhood. Young (1979), in a study investigating young children's music concept development, found that the four-year-olds have a basic understanding of concepts associated with music. She also found that young children can express this understanding often more accurately through manipulative and non-verbal means.

Zimmerman (1984) concurred with the findings reported by Young (1979). In a review of the state of the arts in early childhood music and research, Zimmerman recommended that future research include both observational and experimental data, that there be more longitudinal studies, and that researchers use tasks that are not verbally oriented. She also recommended that efforts be increased to make knowledge about young children's music development available to professional child caregivers.

Even though researchers have reported critical gaps in our knowledge of the musical development of the young child and his/her acquisition of tonal and rhythmic concepts in music (Greenburg, 1976), a significant number of studies have investigated the ways in which children acquire tonal and rhythmic knowledge. The acquisition of tonal and rhythmic concepts in music could be interpreted as auditory perception and discrimination.

Auditory Perception and Discrimination

Researchers and educators have shown a great deal of interest in auditory perception and auditory discrimination of children at the early elementary school level (e.g. Colwell, 1969; Gordon, 1970, 1986; Klanderman, 1979; Klemish, 1968; Petzold, 1969; Tapley, 1976).

Petzold (1969) investigated the ways in which elementary school children aged six to twelve perceived and responded to the auditory presentation of musical sounds. The various tasks required singing responses to the visual presentation of tonal configurations. He found no significant difference between boys and girls in term of their performance on tasks concerned with auditory perception of musical sounds. He also reported that age was a significant factor in the development of auditory perception; most first grade children can develop sufficient aural understandings so that they are able to participate successfully in music reading activities provided such activities utilize simple melodic and rhythmic figures. Petzold found that musical training and out-of-school musical experiences played a significant factor in the development of auditory perception.

Petzold's results also emphasized that rote learning of songs, particularly if the process was carried on in a routine way, failed to provide the child with opportunities to become independent, to develop the ability to evaluate critically the accuracy of responses as compared with the stimulus, or to become aware of the subtle differences between similar but not identical musical material.

The interest in auditory perception and discrimination have sparked the development of standardized measurement instruments. Test developers such as Gordon (1970, 1986) and Colwell (1969) have concentrated on the aural perception of rhythm and pitch. Gordon's Primary Measures of Music Audiation (1986) evaluate children's musical aptitude through pencil and paper tests involving same/different discrimination of tonal and rhythmic patterns.

Research has confirmed that preschool children are capable of discriminating differences and similarities in visual stimuli (Murray & Garrett, 1976; Siegel, 1976). In music, same/different discrimination of tonal and rhythmic patterns is an aural capability of 5-year-olds children (Klanderman, 1979; Jordan-DeCarbo, 1982). Klanderman (1979) studied the development of auditory discrimination and performance of pitch, rhythm, and melody in 3-, 4-, and 5-year-old children. The results indicated that the rhythmic performance ability of preschool children improved with their natural maturation and chronological age. Klanderman also reported that all ages of children performed the interval of a second well. Klanderman's results emphasized the fact that songs for preschool children should encompass the range of middle C to the A above middle C; rhythms should consist mainly of quarter notes and eighth notes and be repetitive. Melodies should contain intervals of a second but should not change directions often. However, Klanderman reported children's difficulty in the understanding of sameness and difference.

Jordan-DeCarbo (1982) investigated the effect on kindergarten children of same/different discrimination techniques, sex, readiness training, and tonal patterns trained with songs or no songs on one aural perception and two singing measures. Over an 11 week period, 89 children randomly assigned to two groups received training in eight tonal patterns. Dependent variables were (1) Primary Measures of Music Audiation (Part I-Tonal), (2) the Criterion Singing Test 1 (10 3-tone patterns), and (3) the Criterion Singing Test 2 (song). Results indicated no significant difference between techniques or among readiness groups.

Tapley (1976), in evaluating musical listening skill training on auditory perception of first grade children over a five week period, found a significant difference in the test scores of listening skills and musical abilities but not in auditory discrimination. The investigator suggested that the training program be extended over a longer periods of time.

The auditory perception and discrimination skills may be divided into rhythmic and pitch perception and discrimination. One developmental outgrowth of perception and discrimination is the ability to perform. Music educators have long regarded rhythmic and pitch performance capabilities an integral part of the vocally oriented primary music classroom.

Rhythmic Performance Abilities

Research suggests that rhythmic performance abilities appear to be influenced by maturation (e.g. Gilbert, 1980; Kerr, 1975; Klanderman, 1979; McDowell, 1974; Rainbow, 1981; Rainbow and Owen, 1979; Schleuter & Schleuter, 1985).

McDowell (1974), in a study to develop and implement a rhythmic ability test designed for 4-year-old preschool children, found that one month of rhythmic training did not significantly affect the rhythmic ability of 4-year-olds.

Gilbert (1980) studied the motor skill development in children aged three to six. Results indicated that motor music skills such as eye-hand coordination and motor pattern coordination improved as subject age increased.

Rainbow (1981) in a study involving preschool children found that 3-year-olds were able to perceive and duplicate rhythmic patterns if a proper method of response was utilized. Results of the 3-year study indicated that the progress of children in learning to do rhythmic tasks is a slow one. In general, significant growth occurred over a 2 year span.

Research findings seem to delineate that while rhythmic performance skills are influenced by maturation and chronological age, motor skill development in children appears to be similarly influenced (Rainbow, 1981; Rainbow & Owen, 1979; Schleuter & Schleuter, 1985). Small motor skills such as clapping appear to be easier than larger muscle movements such as marching or stepping.

Rainbow (1981) reported that 4-year-olds were more successful in clapping rhythms, keeping a steady beat to recorded music by clapping and using rhythm sticks than were 3-year-olds. However, less than 50 per cent of 4-year-olds could complete these tasks. Marching in time was also extremely difficult for 4-year-olds.

In an investigation of the rhythmic ability of preschool aged children, Rainbow & Owen (1979) reported that rhythmic tasks requiring large muscle movements are difficult for 3- and 4-year-old children.

Schleuter and Schleuter (1985) studied the rhythmic responses of primary grade children. They found that the ability to produce physical responses to rhythmic patterns appears to be influenced by maturation with large muscle movements such as stepping more difficult than smaller muscle movements like clapping. Verbal chanting of the rhythmic patterns was the most accurate response for kindergarten pupils, along with clapping for Grade 1 students.

Pitch Discrimination and Pitch Matching Abilities

As singing has long been regarded an integral part of the elementary school music curriculum of both Kodaly-based and traditional music programs, the ability of children to discriminate pitch and accurately pitch match is of concern to educators and researchers.

Zwissler (1971), in a study of first grade children, found a significant difference in the pitch discrimination skills of first grade children identified as accurate singers and those identified as inaccurate singers. Zwissler found no evidence to indicate that first grade children hear the pitch differences of the larger tone intervals more easily than those of the smaller intervals. Also subjects could identify pitch differences more easily within the normal singing range than within the octave above or below, regardless of singing ability. The fact that first grade children who sing accurately in their normal singing range also possess, in general, a more accurate sense of pitch than those who sing inaccurately indicated a strong relationship between the inability to sing and poor pitch perception.

Pitch discrimination can also be trained (cf. Fullard, 1975; Porter, 1977; Simons, 1964). Simons (1964), in a study of the degree of response to music of early childhood twins as compared to singletons, reported success in training pitch discrimination. Fullard (1975) studied pitch discrimination in elementary school children as a function of training procedure and age. The investigator reported that training under the successive-approximations procedures resulted in optimal learning performance. Porter (1977) reported that multiple discrimination training, added to successive approximation techniques, is appropriate as a standard part of training for uncertain singers.

The discrimination of pitch direction using nonverbal performance-based response modes is the most natural way for children to react to pitch direction without substantive training (Hair, 1977; Webster & Schlentrich, 1982). Hair studied the question of response mode in a comparison study of pitch direction using first grade children. The study compared three modes of response: verbal spoken, verbal written, and nonverbal performance-based. Results suggested that children scored significantly higher on the nonverbal performance-based tasks.

Webster and Schlentrich (1982) found similar results in a study investigating the abilities of 4- and 5-year-old children in discriminating pitch direction using 1 of 3 modes of response: verbal spoken, gestural and performance-based. The results suggested that nonverbal, performance-based response modes work best for those children who respond well to minimal procedural training. The investigators noted that informal observation to the different modes of testing demonstrated the children's strong preference for the performance-based mode. Children seemed to be more able to concentrate on and enjoy the performance tasks than the other two modes.

The musical background and training of subjects seems to have an effect on the accuracy of pitch matching. Madsen (1966), in a study on the effect of scale direction on pitch acuity in solo vocal performance, found that subjects with greater formal training in music performed with greater pitch acuity than untrained subjects.

Boardman (1964), investigating the effect of vocal skill-centred training at the preschool level on children's ability to sing accurately, found no significant difference at the .05 level in the vocal accuracy of children who had experienced a vocal skill-centred program and those who had not had such training. However, she found that preschool training did result in some acceleration in the attainment of vocal accuracy.

The ability to sing a melody appears to be related to chronological age. Drexler (1938), in a study of the development of the ability to carry a melody at the preschool level, found that with an increase in age there is an increase in the ability to carry a melody.

The relationship of pitch matching to pitch discrimination has also been investigated (Geringer, 1983; Pederson & Pederson, 1970). Pederson and Pederson (1970), in a study of sixth graders using a rating system of pitch accuracy, indicated low-to-moderate relationships between pitch discrimination and vocal pitch production.

Geringer (1983) studied the relationship of pitch matching and pitch discrimination abilities of preschool and fourth grade students. There were significant differences in pitch matching abilities between the age groups of subjects but no significant differences were reported among the discrimination based ability groups on pitch matching scores. Results showed a moderate correlation ($r = .61$; $p < .01$)

between pitch discrimination and pitch matching with the high ability fourth graders. This result lead to the conjectures that pitch discrimination and pitch matching may simply be two independent abilities or that maturation and training may be necessary to develop an interrelationship.

One of the strongest studies concerning the relationship between pitch discrimination and pitch matching occurred in an investigation by Apfelstadt (1984). Apfelstadt, in a study of the effects of melodic perception instruction on pitch discrimination and vocal accuracy of kindergarten children, compared three instructional settings: one treatment (E1) had vocal instruction designed to promote melodic perception through visual and kinesthetic reinforcement; another treatment (E2) had vocal instruction consisting primarily of imitation alone; and the control group (C) experienced a traditional non-conceptual approach. The E1 treatment of the Apfelstadt study is similar in the present study to the Kodaly-based instructional program in that melodic and rhythmic perception are promoted through aural, visual and kinesthetic reinforcement. The traditional music program of the present study could be analogous to the (C) treatment.

The results showed that there were no differences among groups in aural discrimination or vocal accuracy. The investigator reported that, in general, E1 and E2 achieved better on the vocal tests than C; the conceptually oriented teaching or the difference in teaching style between instructors may have had some effect on vocal accuracy of melodic patterns.

Vocal models, whether they are male or female, seem to have little effect on children's pitch matching responses. Small and McCachern (1983), in a study of the effect of male and female vocal modelling on pitch matching accuracy of first grade children, reported that subjects who could match pitch with one model could generally match pitch with the other.

Ethnographic and Qualitative Designs

Recent studies in music education have utilized ethnographic and qualitative methods as integral parts of the research design (Fiedler, 1982; Madsen & Duke, 1985; Upitis, 1982; Zimmerman,1983).

Fiedler (1982), in a study of two elementary music classrooms at the first and second grade levels, found that a more comprehensive view of classroom processes was obtained through the use of multiple data gathering methods - both qualitative and quantitative. He used three observation techniques: participant observation, an observation schedule, and a structured interview to gather qualitative and quantitative data. An observation schedule was developed to record student behaviours. Trained participant observers gathered frequency data on student production (singing, playing, moving), analytical/conceptual (listening, talking reading and writing), and off-task behaviours. Similar incidents of production behaviours were noted in both classrooms while approximately twice as many analytical/conceptual behaviours were noted in class A than B and more than twice as many off-task behaviours were reported in class B than A.

As preschool children are often inhibited and nonresponsive when placed in testing situations with unfamiliar adults, naturalistic approaches have often been suggested and used in educational research (Greenburg, 1976; Upitis, 1982; Zimmerman, 1984). These naturalistic approaches involve subjects being observed primarily in their own "natural" surroundings.

Upitis (1982) studied a computer-assisted instructional approach for teaching music composition with junior-age children. The investigator used naturalistic observations to examine the wide variety of behaviours of the two subjects.

Zimmerman (1984) and Greenburg (1976), in completing recent literature reviews of research in elementary music education, have suggested that behavioural observation of children in the natural setting and clinical observation of the child should be a part of the measurement techniques for studies in early childhood music education.

Summary

This chapter has provided a review of the relevant literature to the present study. This review demonstrated that there is a gap in our research in dealing with certain aspects of early childhood music education. Specifically, the area of auditory discrimination and the connection of this music behaviour with pitch matching and echo clapping performance skills of young children merits investigation. Also, a gap exists in comparing Kodaly-based music programming with traditional music programs at the early elementary school level. While the mainstream of research in music education has been quantitative in nature, some interest has been shown in incorporating qualitative measures as an integral part of the research design to provide a broader description of the behaviours in the elementary music classroom. A description of the method, dealing with these issues follows in the next chapter.

CHAPTER 3

METHOD

Thus I set pen to paper with delight,
And quickly had my thoughts in black and white.
For having now my method by the end,
Still as I pull'd it came; and so I penn'd
It down, until at last it came to be
For length and breadth the bigness which you see.

John Bunyan,
The Pilgrim's Progress:
The Author's Apology for His Book.

This chapter will delineate the method of the present study. First, the subjects involved in the research will be described. This will be followed by a depiction of the two programs in the study. Finally, the procedure of the investigation will be outlined describing the five phases which include orientation, pretesting, instruction with observer observation, posttesting, and data analysis.

Subjects

This exploratory study compared two types of music instruction: a Kodaly-based developmental music program (Group A) and a traditional public school music program (Group B). The nine month longitudinal study involved two intact kindergarten classes. Group A class contained 17 pupils while Group B had 20 students. The classes were drawn from neighbouring schools in a rural Eastern Ontario school board.

The two classes chosen for this research were similar in terms of sex and socioeconomic level. The classes were drawn from schools of similar enrolment size with approximately 460 students enrolled from kindergarten through to grade eight. Each kindergarten class was staffed with a teacher as well as a full-time teaching assistant. Both kindergarten classes received the equivalent of one half day of school instruction per day. Group A pupils attended each day for a half day: afternoons for the first half of the year and mornings for the second half of the year. Group B pupils attended full days every second day. The total number of school instructional hours for these students was equivalent.

Description of Programs

Group A - Kodaly-based Music Program

Group A received the Kodaly-based developmental music program with separate music instruction provided by the investigator, a music specialist. The regular classroom teacher delivered instruction in all other curriculum areas. Group A received twenty minutes of specialized music instruction every second school day. The pupils received this instruction in the school vocal music room. During the music class the regular classroom teacher and teaching assistant utilized this non-instructional time period for planning and preparation in the home room.

The music room was well equipped. In addition to a piano (tuned to A-440), the room contained a stereo system with turntable and cassette deck as well as a number of rhythmic and melodic instruments. The room contained tables and chairs for use by older students as well as open space where younger children could gather and enjoy movement activities. The walls of the room were attractively decorated with posters, charts, and bulletin boards to stimulate the childrens' interest in music.

During the music class, the children in Group A sang simple songs, played singing games, employed movement using gross and fine motor skills, participated in listening activities and began simple rhythmic and melodic music reading activities within a Kodaly-based framework. The teacher utilized large group, small group and individual activities. Each child was encouraged to act as an independent individual and function independently as a strong member of the group. This was accomplished through the use of positive reinforcement. The term 'positive reinforcement' is used not in the psychological sense but to describe the supportive behaviour on the part of the teacher directed toward pupil effort. This reinforcement involved verbal, gestural or extrinsic means. The teacher used verbal praise for improvement of pupil skill achievement, attentiveness and deportment; children were encouraged to do their best. At the end of each class the best three pupils in terms of skill or behavioural achievement were rewarded with individual printed awards or stars to be placed adjacent to their name on a chart displayed in the music classroom.

At the beginning of the kindergarten year musical experiences focused on repetition and imitation. Gradually simple rhythmic and melodic reading activities became integral parts of each music class.

As a Kodaly-based developmental music program is singing centred, children sang songs and/or singing games in each class. Also at almost every meeting, each child pitch matched the beginning interval (soh-mi) individually. Pitch matching was accomplished through teacher modelling with child imitation and through the use of question-answer strategies. Songs were learned and sung _a capella_. The piano was used judiciously only as an accompaniment for the performance of a previously learned song or as an accompanying instrument by the teacher for free or guided movement.

The song literature was varied. Simple tunes within a limited range were the norm in this curriculum. Many songs originated in the folk music heritage while others were contemporary composed songs selected for their unique artistic, rhythmic or melodic features. The song material was primarily drawn from A _Developmental Music Programme - Stage One_ (Hoermann, 1978) and _Kodaly Approach - Method Book One_ (Daniel, 1979). Songs were chosen to introduce, teach, or reinforce certain musical concepts such as high and low, loud and soft, beat, and rhythm.

The movement activities focused on the development of gross and fine motor skills. Through the playing of improvised pieces at the piano, children discovered rhythmic movement through experiences of walking, marching, running, skipping, galloping, skating, stamping, and hopping. Children also employed free movement while listening and responding to pre-recorded music. More guided or structured movement activities were employed in singing games.

Fine motor skill development occurred through clapping, patsching (knee-slapping), or snapping rhythmic patterns while singing. Occasionally these activities were extended to music response to recorded music.

Listening activities were integrated throughout each class. Children were positively guided in their development of rhythmic and melodic discrimination skills. Self evaluation was encouraged. Each child was encouraged to improve his/her work. Children also experienced listening/movement activities with art music of the masters drawn from the standard classical repertoire.

Group B - Traditional Music Program

The traditional general music classroom (Group B) received integrated music instruction by a classroom teacher. This classroom teacher provided the majority of curricula instruction for these kindergarten pupils. As in Group A, a teaching assistant complemented the classroom teacher in the delivery of program. The students received approximately 45 to 50 minutes of music activities every second day. The activities were interspersed throughout each instructional day.

The kindergarten classroom acted as the setting for the majority of the music experiences of the children. Occasionally the gymnasium was used for certain movement activities. The classroom was attractively decorated reflecting the integrated environment. Bulletin boards displayed many aspects of the total educational program for these kindergarten pupils. Tables were grouped together in different sections while centres such as sand, water, and paint provided learning opportunities for the children in other areas of the room. The room contained a piano (not tuned to A-440) and a set of rhythm band instruments. A portable record player as well as a listening centre complemented the audio-visual equipment in this classroom.

The children in Group B experienced a well-rounded music program; they sang songs, played singing games, moved to music using gross and fine motor skills, and experienced listening activities. The teacher primarily utilized large group instruction but also included some individual experiences for children. The philosophy employed in this program centred on enjoyment through participation in a variety of musical activities during the course of the school day. The teacher positively reinforced pupils' achievements through verbal praise. She was regarded as a skilled music teacher by her peers.

Each morning in Group B class, the teacher and pupils would gather together to sing a variety of songs including a greeting, an attendance roll call, the national anthem and hymns. The classroom teacher provided piano accompaniment for the majority of these songs sung daily by the children. The children also enjoyed singing along to various tapes and records recorded by popular children's entertainers: (e.g. Raffi; Sharon, Lois and Bram; Fred Penner, April and Susan). Many of the songs used in the program were selected to tie in with the thematic approach.

Mother Goose rhymes and singing games were typical activities during the early fall. The teacher used the rote method to teach most songs.

Movement activities were incorporated in singing games, in accompanying certain rhymes, while listening to records, and in the playing of rhythm band instruments. The singing games included both gross and fine motor skills. Finer motor skills were developed through clapping, patsching or finger plays as accompaniments to songs or rhymes. The teacher used records stressing physical exercise and creative movement (e.g. Hap Palmer and Mousercize). The children used rhythm band instruments to accompany songs.

Listening activities were integrated throughout each school day. The teacher frequently sang instructions to the children. Children listened to relaxing recorded music during their rest time.

Procedure

This study consisted of five phases: orientation, pretesting, instruction with observer observation, posttesting and data analysis.

The orientation provided a time period for the children to become familiar with the investigator before testing to reduce test anxiety. The investigator met with both groups for three hours each during the first month of school. Group A was visited by the investigator every second day for twenty minutes while the investigator met with Group B for three sessions of an hour each. To maintain consistency, the orientation involved similar songs, singing games, and activities.

Instrumentation

Five different measures were chosen to compare pupils from the Kodaly-based developmental music program and pupils from the traditional general music program. The pretest included the tonal and rhythmic sections of the Primary Measures of Music Audiation (PMMA) (Gordon, 1986), a 10-item investigator designed Pitch Matching Test (PMT) (see Appendix A), a 10-item investigator designed Echo Clapping Test (ECT) (see Appendix B), and a short interview with each child.

The PMMA was chosen to evaluate the tonal and rhythmic discrimination aptitudes of each child. The simple design of the same/different response in the PMMA helps overcome the difficulty that the very young child experiences in following directions and marking answers on the tests (Roach, 1981).

The reliability of the PMMA has been reported by Gordon (1986) and follows in Table 1 (p. 91). These results suggest that both the tonal and rhythmic subtests of the PMMA have a high degree of internal consistency. The test-retest correlation coefficients

Table 1

Reliabilities, Standard Errors of Measurement, and Standard Errors of a Difference for Primary Measures of Music Audiation

	Tonal	Rhythmic	Standard Error of a Difference
Kindergarten			
Split-Halves	.85	.72	
Test-Retest	.73	.60	2.7
Standard Error of Measurement	1.8	2.0	

suggest that each of the subtests is moderately stable.

In relation to test validity, Gordon (1986) reported the respective item difficulty and discrimination indexes for administration of the PMMA with kindergarten children. The item difficulty (p) for the 40 items in the tonal subtests ranged from p = .30 to p = .80 with the average listed at p = .63. The item difficulty for the rhythmic subtests contained a range from p = .22 to p = .82 with p = .57 as the average item difficulty level.

The discrimination indexes (D.I.) for the PMMA are for the most part above the minimum standard of D.I. = .20. For the tonal subtests the discrimination indexes ranged from D.I. = .20 to D.I. = .54 with the average D.I. being .36. The rhythmic subtests had a range from D.I. =.20 to D.I. = .44 with .28 as an average.

In other areas of test validity, Gordon (1986) also reported the intercorrelations among the subtests. The tonal subtests correlated to the rhythmic subtests at p = .45. Gordon also supported the validity of the PMMA through means and standard deviations achieved during samples establishing norms, the correlation of test scores with other criteria such as teachers' ratings or grades, and correlation of test scores with scores on similar types of tests.

The PMT and ECT were designed to evaluate pitch matching performance skills and echo clapping rhythmic performance skills. The interview questions were designed to ascertain the possible effect of the home musical background on the achievement in the classroom.

All tests were administered by the investigator in the pupils' own school. For the group test administration, tests were given in the homeroom or classroom environment; the individual tests were administered in a smaller tutorial room located near the homeroom.

The PMMA was administered to each group of students following a brief preparatory activity designed by the investigator to acquaint the children with the concept of "same" and "different". The activity was modelled after the two happy faces for "same" and a happy face and sad face for "different". In a group situation, the investigator posed the following questions:

1. Put your finger on the top box. There are two faces in this box. Are they happy or are they sad? ... Do they look the same or do they look different?

2. Now, put your finger on the box on the bottom. There are two faces in this box. Are they the same or

are they different?
Following this brief activity, the practice items of the PMMA tonal ensued.

The tonal section of the PMMA was administered first and the rhythm section of the PMMA followed on a different day within two weeks. During the administration of these pencil and paper tests, the classroom teacher and the teacher assistant assisted the investigator as proctors to help in the prevention of pupil miscues. They monitored students' progress to ensure that they were scoring in the appropriate place for each test item administered.

The PMT, ECT, and interview were administered to each child individually by the investigator. These tests were audiotape recorded.

The PMT consisted of ten items of varying difficulty. Each item consisted of two tones pitched easily within the early childhood singing range (D - A above middle C). The items contained four examples of the falling minor third, two examples of the rising minor third, one rising major third, two rising major seconds and one falling major second. The investigator vocal modelled each of the items using head voice (falsetto). Simple words or a neutral vowel sound were used for these pitches. Each child was given two chances in order to pitch match individual items. Subjects were tested individually.

The ECT consisted of ten items of varying difficulty. Each item contained a four beat pattern in common time. Combinations of quarter notes, eighth notes and quarter rests comprised each of these rhythmic items. The investigator modelled each item by the clapping of hands. Each child was provided with two chances to correctly reproduce the given rhythmic pattern. As in the PMT, subjects were heard individually.

The interview with each child focused on the preschool and home musical background of the child. Pupils were asked if they played any musical instruments, if they received any private music lessons, and if either or both of their parents sang songs to them.

The instructional segment of the study proceeded for the following eight months. During this time the two programs were observed by two different teams of observers.

The internal observer team consisted of the principal from each of the respective schools. To acquaint these observers with field study techniques, the two school principals received three training sessions in ethnographic observation. Following this training period, the investigator arranged a schedule of 14 visits, seven in each kindergarten classroom spread out over the succeeding seven months. The two principals concurrently observed the program in their own school as well as the program in the neighbouring school. The investigator outlined observer guidelines for each principal (Goetz and LeCompte, 1984) (see Appendix C). These observers recorded by hand a diary of field notes.

The external observers were experienced classroom ethnographers. Following a briefing on the intent of the study, the two observers made one visit midway through the year to each classroom, and recorded field notes by hand. In addition, the observers conducted interviews with the two music teachers. These interviews were audiotaped. Following the observation and interviews, the research assistants, based on what they had observed and heard, also audiotaped a discussion comparing the two music programs.

Ethnographic descriptions gathered from the external observers' interviews with each teacher in the study as well as field notes of these observers yielded rich results. However, the descriptions of the two internal observers did not produce data as rich as one would have hoped. Possible reasons will be discussed in the discussion and implications chapter.

The posttests began during the final month of school. The tonal and rhythm sections of the PMMA were readministered followed by the PMT and ECT. The same procedures were utilized for administration of the posttests as in the pretests.

Data analysis was performed by the investigator. The PMMA pretests and posttests were scored manually following procedures outlined by Gordon (1986). Tonal and rhythm test scores were recorded in the raw score form. The composite scores were not computed as the aim of the present study pertained to rhythmic discrimination and pitch discrimination, not auditory discrimination.

The PMT pretests and posttests were evaluated by the investigator according to the following rating scale which appears in Figure 1.

The ECT pretests and posttests were evaluated by the investigator using the following rating scale which appears in Figure 2.

Both PMT and ECT scores were kept in their raw form.

Summary

This chapter has outlined the subjects of the

Figure 1. Rating scale of the pupil's performance of the tonal pattern in the Pitch Matching Test (PMT).

1. Neither pitch was recognizable.
2. Contained correct melodic direction but excluded any accurate pitches.
3. Contained correct melodic direction and included one accurate pitch.
4. Was nearly accurate but lacked precise intonation.
5. Was precise and included accurate pitch matching.

Figure 2. Rating scale of the pupil's performance of the rhythmic pattern in the Echo Clapping Test (ECT).

1. Was not recognizable.
2. Was nearly accurate but at a different consistent tempo.
3. Was nearly accurate at a consistent tempo.
4. Was accurately reproduced but at a different tempo.
5. Was accurately reproduced with correct consistent tempo.

present study followed by description of the two programs. The depiction of the procedures ensued with a profile of the five phases which included orientation, pretesting, instruction with observer observation, posttesting, and data analysis. The results of the data analysis are reported in the following chapter.

CHAPTER 4

RESULTS OF THE DATA ANALYSIS

What we call results are beginnings.

Emerson,

Representative Men: Plato

The results of the present study are indeed beginnings. This chapter will first report the descriptive results of the observers, dealing first with the Kodaly-based instructional group, followed by a depiction of the traditional music program. The results of the pupil interviews will then ensue. In the following section, the results of the statistical analysis will be set forth. These will include analysis of means, standard deviations and analysis of variance for each of the measures. Also, the results of the multiple linear regression will be reported. An analysis of the correlation among the measures will then follow. The chapter will conclude with an overall comparison of the programs.

Music Experiences in a Specialized Setting

Organization of Classroom

The students in the Kodaly-based class (Group A) received their music instruction in a specialized setting. The classroom was organized to accommodate older students sitting at hexagonal tables as well as open space for younger children to gather in a broad arc around the teacher focal point. For the majority of music instruction for the kindergarten class, the seating arrangement involved the latter seating plan. The children sat on the floor around the teacher who was seated on a short primary chair. Immediately behind the teacher was a blackboard with a ledge. The blackboard was used occasionally for visual clarification, while the ledge held instructional charts. Beside the teacher's chair was a table containing various books and teacher resource materials. An overhead projector was located adjacent to the arc student grouping and the projection screen was mounted on the wall behind and above the teacher's head. Variety and diversification of classroom organization were added to the classes when children were involved in singing games and creative movement activities.

Adjacent to the area for the focused instruction was a piano. The piano was regularly maintained and tuned to A-440. Orff melodic and rhythmic instruments were situated at a side table. A stereo system was housed at the back of the room with speakers in opposite corners of the classroom.

Teaching techniques

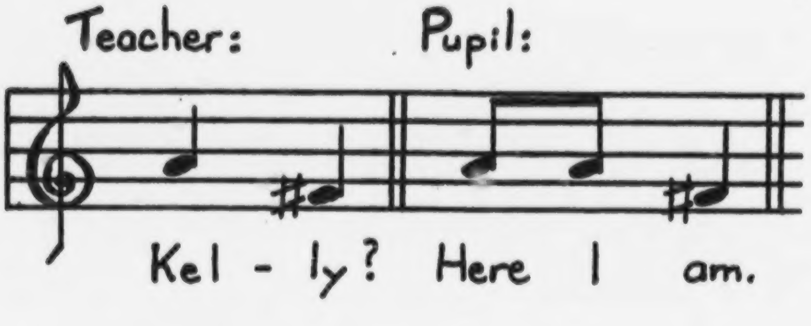
The music activities that the pupils experienced in the Kodaly-based instruction involved singing, listening, creating, playing, and moving.

Each class began with a singing greeting by the teacher; children echoed this greeting song as a group. Immediately following the teacher took attendance through an individual pitch matching exercise as shown in Figure 3.

The teacher varied the starting pitches for the each pupil. If the child accurately pitch matched, the teacher provided positive verbal reinforcement. If the child was unsuccessful at matching the pitches, the teacher provided remediation. Occasionally the teacher sang a slide from where the child sang to the expected pitch trying to get a head tone. All efforts and achievements were positively reinforced.

Echo clapping activities and rhythmic reading activities were an integral part of the classes. For

Figure 3. Pitch Matching Exercise.


Teacher:
Pupil:
Kel - ly? Here I am.

the rhythmic reading activities, the pupils clapped and verbalized rhythmic time names. The teacher used a variety of large group, small group and individual strategies. During a portion of one large group rhythmic reading exercise one of the external observers noted: "The teacher pointed out: 'I like this rest, this 'ta' and this rest. But I heard some people do something different here. Let's fix it up.' All children clapped again; it was right this time." The teacher used this positive instructional sequence with small group and individual pupils alike.

The teacher used simple melodic reading exercises to reinforce previous rote learned melodic sequences. The students followed the teacher model and used Kodaly hand signs to demonstrate the spatial relationship of the falling third (soh - me). The teacher employed large group, small group and individual strategies with a focus on each pupil. During one lesson an external ethnographer observed the teacher drawing the pupil's attention to a chart and remarked: "Look, Tara! Are you ready to start?"

The singing material for Group A pupils was taught by the teacher a capella (without piano accompaniment). The piano was used judiciously as an accompanying instrument for the children's singing, usually as a culmination of the learning process. Once the song was completely learned, the teacher would occasionally accompany the children from the keyboard. The piano was also used by the teacher to provide improvised piano accompaniment for creative movement.

Evaluation of student achievment was both formative and summative. The teacher evaluated each students' progress in certain skill areas through continuous formative evaluation. For example, the teacher evaluated and recorded in a mark book each pupil's individual pitch matching proficiency in every class. Pupils were provided with immediate verbal feedback on their achievement or improvement during each class. A summative music skills checklist for the Group A kindergarten program was developed by the music teacher as part of the overall kindergarten skills checklist in the report card distributed to parents at the school year end. This is included in Appendix D.

Music Philosophy

The philosophy in this program was oriented towards music skill development of the individual. Through teacher action and encouragement, pupils were nurtured to become independent learners in the class. Positive reinforcement of student behaviours played a key role in the instruction here. The teacher utilized phrases such as "I like the way that Helen was a leader in marching to the beat of the music; try to improve and be a leader, too". Each child was encouraged to be an individual and function independently but also be very aware of how to work in a group as well. One of the internal observers noted: "Positive reinforcement was enjoyed by all students bringing strong desire to follow rules".

Each child was encouraged to achieve to the best of his/her ability. One of external observers remarked that during a class when one song called for actions to the words 'tie your shoes' Ryan said, "But, I can't tie my shoes." The teacher answered, "Well, you try your best, don't you?" Ryan replied, "Yes". And the teacher responded, "Well, that's all that I expect". The philosophy of positive reinforcement and encouragement of each child achieving to the best of his/her potential was consistent throughout the teaching.

Interactions with Individual Students

The teacher blended group and individual interactions throughout each class. Singing games, songs and creative movement were group oriented activities while certain behaviours such as pitch matching and rhythmic echo clapping were managed individually. The teacher provided positive reinforcement verbally as well, at the conclusion of each class, distributed three extrinsic rewards in the form of stars or seasonal awards to the top three students in terms of achievement or improvement in skill areas. One of the external observers commented, "the students appreciated them (the awards)".

The observers noted that the atmosphere in this classroom was focused on the tasks at hand. While children were learning new songs, clapping rhythmic passages from flash cards or improvising movements, each individual pupil's attention was directed in some manner. At times, students were directed to a teacher model, while, in other instances, children were used as models to emulate.

The external and internal observers remarked on the full participation level of the pupils. There was a high degree of enjoyment among the children. No child seemed embarassed to be doing anything individually. One of the external observers remarked, "They don't seem to be self-conscious at all. ... This is so musical! I mean, the quality of music is so important. And yet, they are still having fun; that was quite obvious. They were having a great time!"

Music in the General Classroom

Organization of Classroom

The classroom of the traditional music teacher (Group B) contained many centres for individual and small group learning activities. For example, a sand table, water table, and a listening centre with tape recorder and a small set of earphones were typical centres that children explored during their activity time. The seating arrangement for the majority of the singing activities was in the circle format. Singing games, rhythm band and creative movement activities provided alternate modes for student learning. During quiet time for rest in the early afternoon, students laid on the carpet area. While they were relaxing, the teacher played tranquil audio recordings of various styles of music (e.g. guitar music of Los Indios Trabajaras).

A piano was situated near a carpet area where children gathered for the singing of songs. The piano was at one point tuned but during the duration of the study the piano required tuning. The piano was tuned during the second last month of the study. The rhythm band instruments that the children frequently played were housed at the side of the room. Adjacent to the piano was an easel with charts to assist the teacher with visual reinforcement of teaching points. A record player was situated nearby. Movement and singing game activities were usually carried out in the school gymnasium.

Teaching Techniques

In Group B, the observers found music to be an integral part of the kindergarten classroom. Music activities were interspersed throughout the school day; music was used instrumentally as a medium or break between other classroom activities. The teacher would sing a song to bring children together at the carpet area or perhaps sing instructions for children to line up to visit the school library. Each day began with the singing of familiar songs, hymns, and O Canada. Movement activities and singing games were also included in the physical education classes in the gymnasium.

The teacher frequently used the child's interest as a springboard for the learning for the rest of the class. During the interview by the external observers the teacher stated: "It is just like that tape that came in this morning. We've heard some of it; we've moved a little bit already to it and so everytime I do anything really it is very incidental learning, spur of the moment and I find that that's the happiest way to do things especially in kindergarten."

For the teaching of a new song the teacher would play the song on the piano and sing. The children watched and listened. The teacher would play one line at a time followed by the children singing by rote. One external observer noted: "All children were listening but not many children sang on pitch. They sang quite a bit lower."

The observers noted that in a number of the singing activities, not all students were singing. In action songs, a few students sang but most just performed actions. For example, one of the external observers noted: "During the singing of _Row, Row, Row your Boat_ all children were rowing enthusiastically but not all were singing. The teacher stopped the actions and stressed that singing was not happening; the teacher started over. The teacher supervised rowing and lead singing. Several children were still chanting, not singing."

In many of these songs that were sung while in the circle format, students attention was directed at each other rather than the teacher. In most of these cases, the teacher lead the singing while accompanying the children at the piano.

For pitch matching, the teacher sang a roll call each school day and each child responded individually. During the interview the teacher commented: "I can see who is really coming along nicely and I may star when they have done really well or if they are still sort of speaking and they haven't discovered that head voice yet, then I'll just make a check mark and know that I have to kind of work on that. Quite often I'll draw them aside to the piano and I'll play the note and we'll go from the basement to the attic and back down and we'll try to get that range going up and down and let them find the note in between."

The teacher also stated the pitch correction procedures with the following explanation: "If I find that someone just doesn't quite have the tune, I will sing into their ear."

Evaluation in Group B involved primarily formative evaluation. The teacher used observational techniques in evaluating student progress. A summative checklist included items pertaining to each child's enjoyment and participation in music activities.

Music Philosophy

In the interview, the teacher stated the philosophy that music and a lot of singing makes for a happier learning environment in the kindergarten classroom. The teacher believed that primary teachers should have a background in music and share that with their children.

The philosophy of the Group B program centred around fun. One of the external observers commented: "Fun was the global concept and the music was incidental. Sure the concepts are there: melody, rhythm, etc., but they are not attacked in an orderly fashion. They are just all there in a positive way. They felt good about themselves, but they weren't being focused in what they were doing."

The teacher used positive reinforcement effectively. For example, one of the external observers reported that during one activity where children were to model the teacher's actions, the teacher lauded the pupils with: "Good for you, Billy!" and "Super!".

Interactions with individual students

The majority of the activities in this class were group oriented. Group listening and moving to records, singing songs while accompanied on the piano by the teacher and playing rhythm band instruments form the core of the music program. Tone matching and pitch correction were accomplished informally and these tended to be more individualized.

The teacher was cognizant of the needs of each individual child. The teacher commented, "There are certain children that you probably noticed weren't singing that much. My little John seems like he's really off in a daydream sometimes but when it comes to games he really gets into it, especially in the Phys. Ed. area if we are dancing or moving to music."

The observers noted on many occasions that during the group instruction not all pupils were participating (e.g. "During O Canada a few did not sing." "Only three or four students were singing along with the teacher." and "Some students were not doing actions but were trying to sing.").

Home Musical Background

An analysis of the individual interviews with each child subject showed that both groups of children had similar home musical backgrounds. When asked whether either parent sang songs to them at home about one quarter (23%) in Group A had parents who regularly sang to them as pre-schoolers while approximately one third (36%) of Group B routinely experienced singing in the home setting.

Both groups of children had similar experiences with musical instruments in the home. For the majority of the children, these involved toy versions of traditional instruments such as xylophone, drum, guitar, piano, or recorder. In Group A approximately one half (47%) of the children had one type of musical instrument at home compared to about one third (36%) in group B. The instruments were usually used in a play situation.

Two children were involved in private music lessons outside of school, one child in each group.

Statistical Analysis

Statistical analysis involving Primary Measures of Music Audiation (PMMA), Pitch Matching Test (PMT), and Echo Clapping Test (ECT) was computed using the program, Mystat Version 2.0 (1988). Due to subject mobility and pupil absenteeism, nine cases contained missing data. To best predict an estimation of student performance for the missing values, a simple linear regression on one variable was computed for each variable with missing data. The predicted scores were then incorporated into the data base.

To compare the achievement of each group, means and standard deviations and analysis of variance were computed for each of the three measures.

To measure the effect of group in the posttest scores while controlling for pretest differences, a multiple linear regression was computed with pretest and group as predictors. The level of significance was set at $p < .05$.

To determine the linear relationship between any two redundant variables, the Pearson product-moment correlation coefficients were computed as presented in Appendix E. The level of significance was set at $p < .05$.

The reliability and validity of the PMMA has previously been reported in the method chapter.

The validity of the Pitch Matching Test and the Echo Clapping Test has been delineated in the method chapter. The reliability of the the two investigator-designed instruments, the Pitch Matching Test (PMT) and the Echo Clapping Test (ECT) was computed following a reliability procedure for likert scales outlined by Ray (1972). The results as shown in Table 2 suggest that both the Pitch Matching Test and Echo Clapping Test were highly internally consistent.

Table 2

Reliabilities for

Pitch Matching Test and Echo Clapping Test

	Reliability Pitch Matching Test	Reliability Echo Clapping Test
Pretest	.95	.92
Posttest	.95	.89

Analysis of Means, Standard Deviations and Analysis of Variance

Means, standard deviations, and analysis of variance for the variables by group in the PMMA are presented in Table 3. These results show that the mean scores of Group B were always higher than those of Group A. A one-way analysis of variance was performed that revealed the difference between the means of the groups was not statistically significant on any of the measures.

In analyzing the means and standard deviations of the PMT shown in Table 4, it was noted that in the pretests Group A and Group B had similar means and similar standard deviations. An analysis of variance was performed as presented in Table 4 that revealed the difference between the means was not statistically significant. However, in the posttests, Group A had higher means than Group B and Group A's standard deviations were significantly lower than Group B. A one-way analysis of variance was computed that revealed a statistically significant effect for group on 7 of the 10 items of the PMT posttests (see Table 4). While Group A achieved higher mean results than Group B on PMT posttest items 1, 8 and 9, the difference between

Table 3

Means, Standard Deviations and Analysis of Variance for Primary Measures of Music Audiation

	Group A (*n* = 17)		Group B (*n* = 20)		
Test	$\bar{X}$	*SD*	$\bar{X}$	*SD*	*F*-Ratio Means
Tonal - Pre	21.4	5.8	25.6	6.6	1.29
- Post	25.4	6.6	28.6	5.6	.71
Rhythmic - Pre	21.6	5.3	22.9	4.0	.56
- Post	23.5	4.8	25.8	5.3	1.21

* Large differences between the means in terms of their SD.

the means was not statistically significant. The results suggest that, at the conclusion of the study, pupils in Group A could pitch match significantly better than Group B pupils and that they were more of a homogenous group.

These findings support those of the external observers reported earlier. The Group A teacher's focus on the independent individual had a positive effect on pupil's pitch discrimination performance skills. The observers noted the Group A teacher's instructional techniques concentrated on individual pupil performance of pitch matching skills, echo clapping activities, as well as simple rhythmic and melodic reading exercises. Furthermore, the teacher's aim for perfection and the positive encouragement for the children to achieve to the best of their potential seemed to positively affect the enthusiatic participation by all pupils.

While some students in Group B could effectively pitch match at the conclusion of the study, the Group B teacher's orientation towards group activities had less effect on each individual pupil's pitch discrimination performance skills. The findings of the external observers reported earlier support this conclusion.

Table 4

Means, Standard Deviations and Analysis of Variance for Pitch Matching Test

	Group A (n = 17)		Group B (n = 20)		
Items	X̄	SD	X̄	SD	F-Ratio Means
1 - Pre	2.9	1.2	2.7	1.2	1.00
- Post	4.1	1.0	3.5	1.3	1.69
2 - Pre	2.8	1.1	2.7	1.2	1.19
- Post	3.8	0.9	3.1	1.9	4.45 *
3 - Pre	2.9	1.2	2.9	1.5	1.56
- Post	3.9	0.9	3.1	1.4	2.41 *
4 - Pre	3.1	1.4	3.2	1.5	1.27
- Post	4.2	0.7	3.2	1.4	4.00 *
5 - Pre	3.1	1.5	2.7	1.5	1.00
- Post	4.2	0.8	3.4	1.4	3.06 *
6 - Pre	3.2	1.6	2.8	1.6	1.00
- Post	4.2	1.0	3.2	1.5	2.25 *
7 - Pre	3.0	1.3	2.8	1.7	1.71
- Post	4.0	0.9	3.4	1.4	2.41 *

table continues

Items	Group A ($\underline{n}$ = 17)		Group B ($\underline{n}$ = 20)		
	$\bar{X}$	SD	$\bar{X}$	SD	F-Ratio Means
8 - Pre	2.9	1.4	2.3	1.5	1.14
- Post	3.8	1.1	3.1	1.4	1.61
9 - Pre	3.1	1.1	3.0	1.1	1.00
- Post	3.8	1.0	2.8	1.3	1.69
10 - Pre	3.4	1.2	3.1	1.0	.69
- Post	4.4	0.6	3.0	1.3	4.69 *

* Large differences between the means in terms of their SD.

They observed some individual pitch matching strategies, however the focus of the program involved group singing activities. Despite the teacher's fine use of positive reinforcement and encouragement for pupil improvement during these group activities, a significant number of pupils still opted out of participation.

In examining the means and standard deviations of the ECT shown in Table 5, the pretests of the ECT showed that Group A and Group B had similar means and standard deviations. A one-way analysis of variance was performed that revealed a statistically significant difference in the means of only one item, item 6, $\underline{F}(16,19) = 2.41$, $\underline{p} < .05$. No significant difference was reported on any of the other nine pretest items of the ECT.

In the ECT posttests, Group A had higher means than Group B and the standard deviations of Group A were appreciably lower than Group B. However, in the analysis of variance, there was a statistically significant difference between the means of items one to seven inclusive. Although Group A achieved higher than Group B on items 9 and 10, the differences were not statistically significant. Both groups achieved

Table 5.

Means, Standard Deviations and Analysis of Variance for Echo Clapping Test

	Group A (_n_ = 17)		Group B (_n_ = 20)		
Items	$\overline{X}$	_SD_	$\overline{X}$	_SD_	_F_-Ratio Means
1 - Pre	3.6	1.0	3.2	1.1	1.21
- Post	4.4	0.7	3.7	1.2	2.93 *
2 - Pre	3.8	1.0	3.6	1.1	1.21
- Post	4.7	0.5	4.1	0.8	2.65 *
3 - Pre	3.9	1.2	3.7	1.0	.69
- Post	4.7	0.5	4.0	0.9	3.24 *
4 - Pre	3.7	1.3	2.7	1.4	1.15
- Post	4.7	0.7	3.7	1.4	4.00 *
5 - Pre	3.7	1.0	3.5	1.4	1.96
- Post	4.6	0.6	4.1	1.2	4.00 *
6 - Pre	4.1	0.9	3.5	1.4	2.41 *
- Post	4.6	0.6	4.1	1.0	2.77 *
7 - Pre	3.7	1.0	3.3	1.3	1.69
- Post	4.7	0.5	4.0	1.1	4.84 *

table continues

	Group A (*n* = 17)		Group B (*n* = 20)		
Items	$\overline{X}$	*SD*	$\overline{X}$	*SD*	*F*-Ratio Means
8 - Pre	3.0	1.0	3.1	1.3	1.69
- Post	3.7	1.1	3.7	1.2	1.19
9 - Pre	3.4	1.1	3.2	1.1	1.00
- Post	4.3	0.8	3.5	1.0	1.56
10 - Pre	3.2	1.2	3.3	1.1	.84
- Post	4.2	0.8	3.6	1.1	1.89

* Large differences between the means in terms of their SD.

similarly on item 8.

The results suggest that following the 10 months of instruction, the students in Group A could, as a group, echo clap significantly better than their counterparts in Group B and that they were more of a homogenous group. The greater standard deviation in the Group B scores suggest that a number of pupils in traditional classrooom music program still encountered difficulty in echo clapping simple rhythmic patterns at the conclusion of the study.

These findings support those reported earlier by the external observers. The focus on the performance of the individual in Group A as compared to the more group oriented focus of Group B seem to suggest that individual pupils in Group A learned to discriminate and perform rhythmic patterns more keenly than did their counterparts in Group B.

Analysis of Multiple Linear Regression

Data from the two groups were compared by the multiple linear regression analysis of variance. The level of significance was set at $p < .05$. The multiple linear regression measured the effect of group while controlling for pretest differences.

Results in the PMMA tonal and rhythmic tests as reported in Table 6 showed that both groups showed significant gain from the pretest to the posttest. However, there were no significant differences between the groups for either the tonal or the rhythmic measures.

Results from the PMT as reported in Table 7 showed a significant gain from the pretest to the posttest in 9 of the 10 measures. Group A scored higher than Group B in all of the ten measures; however, results revealed that the difference of Group A over Group B was significant in 5 of the 10 items.

In the ECT as shown in Table 8, results revealed a significant gain from pretest to posttest in 7 of the 10 items. There was no significant difference in items one, two, and three. Group A scored higher than group B in all of the ten measures, however, the gain of Group A over Group B was statistically significant in 6 of the 10 measures.

Correlation Among the Measures

Analysis of the correlation coefficients determined that the tests of the PMMA and those of the PMT and ECT were indeed measuring different musical aptitudes or behaviours.

Table 6

Multiple Linear Regression for

Primary Measures of Music Audiation

Dependent Variable	Variable	Beta Coefficient	Std Error	t	p(2 Tail)
PMMATPST	Constant	10.736	3.177	3.380	0.002
	PMMATPRE	0.666	0.121	5.495	0.001 *
	Group	0.403	1.568	0.257	0.799
PMMARPST	Constant	5.919	3.379	1.752	0.089
	PMMARPRE	0.753	0.134	5.613	0.001 *
	Group	1.315	1.231	1.069	0.293

* Significant at the .05 level.

PMMATPRE - Primary Measures of Music Audiation Tonal Pretest

PMMATPST - Primary Measures of Music Audiation Tonal Posttest

PMMATRPRE - Primary Measures of Music Audiation Rhythmic Pretest

PMMARPST - Primary Measures of Music Audiation Rhythmic Posttest

Table 7

Multiple Linear Regression for

Pitch Matching Test

Dependent Variable	Variable	Beta Coefficient	Std Error	_t_	_p_(2 Tail)
PMT1PST	Constant	3.558	0.750	4.742	0.000
	PMT1PRE	0.362	0.152	2.375	0.023 *
	Group	-0.543	0.364	-1.493	0.145
PMT2PST	Constant	3.644	0.837	4.354	0.000
	PMT2PRE	0.301	0.177	1.704	0.097
	Group	-0.671	0.401	-1.673	0.104
PMT3PST	Constant	3.586	0.704	5.095	0.000
	PMT3PRE	0.411	0.135	3.051	0.004 *
	Group	-0.854	0.354	-2.410	0.022 *
PMT4PST	Constant	3.999	0.679	5.893	0.000
	PMT4PRE	0.374	0.124	3.026	0.005 *
	Group	-0.989	0.347	-2.851	0.007 *
PMT5PST	Constant	3.228	0.634	5.088	0.000
	PMT5PRE	0.488	0.108	4.534	0.001 *
	Group	-0.573	0.317	-1.808	0.079

table continues

Dependent Variable	Variable	Beta Coefficient	Std Error	_t_	_p_(2 Tail)
PMT6PST	Constant	3.524	0.684	5.151	0.000
	PMT6PRE	0.492	0.112	4.407	0.001 *
	Group	-0.850	0.347	-2.450	0.020 *
PMT7PST	Constant	2.979	0.607	4.911	0.000
	PMT7PRE	0.522	0.105	4.975	0.001 *
	Group	-0.546	0.313	-1.745	0.090
PMT8PST	Constant	2.471	0.686	3.601	0.001
	PMT8PRE	0.579	0.119	4.860	0.001 *
	Group	-0.352	0.340	-1.034	0.308
PMT9PST	Constant	3.301	0.797	4.141	0.000
	PMT9PRE	0.450	0.166	2.706	0.011 *
	Group	-0.939	0.360	-2.612	0.013 *
PMT10PST	Constant	4.504	0.802	5.615	0.000
	PMT10PRE	0.323	0.158	2.045	0.049 *
	Group	-1.252	0.341	-3.675	0.001 *

* Significant at the .05 level.

PMT PRE - Pitch Matching Test - Pretest

PMT PST - Pitch Matching Test - Posttest

Table 8

Multiple Linear Regression for

Echo Clapping Test

Dependent Variable	Variable	Beta Coefficient	Std Error	t	p(2 Tail)
ECT1PST	Constant	4.710	0.845	5.577	0.000
	ECT1PRE	0.112	0.158	0.709	0.483
	Group	-0.706	0.340	-2.078	0.045 *
ECT2PST	Constant	5.508	0.556	9.902	0.000
	ECT2PRE	-0.048	0.104	-0.460	0.648
	Group	-0.619	0.223	-2.780	0.009 *
ECT3PST	Constant	5.332	0.636	8.384	0.000
	ECT3PRE	0.031	0.115	0.270	0.789
	Group	-0.748	0.257	-2.909	0.006 *
ECT4PST	Constant	3.514	0.746	4.710	0.000
	ECT4PRE	0.466	0.117	3.974	0.001 *
	Group	-0.537	0.331	-1.622	0.114
ECT5PST	Constant	3.643	0.664	5.489	0.000
	ECT5PRE	0.379	0.118	3.204	0.003 *
	Group	-0.460	0.295	-1.562	0.128

table continues

Dependent Variable	Variable	Beta Coefficient	Std Error	_t_	_p_(2 Tail)
ECT6PST	Constant	3.694	0.679	5.437	0.000
	ECT6PRE	0.292	0.112	2.611	0.013 *
	Group	-0.308	0.272	-1.133	0.265
ECT7PST	Constant	4.045	0.605	6.685	0.000
	ECT7PRE	0.345	0.108	3.205	0.003 *
	Group	-0.616	0.259	-2.380	0.023 *
ECT8PST	Constant	2.059	0.655	3.144	0.003
	ECT8PRE	0.560	0.139	4.020	0.001 *
	Group	-0.034	0.315	-0.108	0.915
ECT9PST	Constant	3.276	0.580	5.651	0.000
	ECT9PRE	0.517	0.118	4.369	0.001 *
	Group	-0.715	0.251	-2.851	0.007 *
ECT10PST	Constant	3.554	0.553	6.426	0.000
	ECT10PRE	0.448	0.118	3.801	0.001 *
	Group	-0.741	0.260	-2.848	0.007 *

* Significant at the .05 level.

ECT PRE - Echo Clapping Test - Pretest

ECT PST - Echo Clapping Test - Posttest

Strong pretest-posttest relationships were observed among the PMMA variables (see Appendix E). The relationship between the tonal pretest and tonal posttest of the PMMA was significant ($r = .71$, $p < .05$). The rhythm pretest correlated to the rhythm posttest of the PMMA significantly ($r = .70$, $p < .05$). The tonal tests also correlated strongly to the rhythmic tests.

Conversely, the pretests and posttests for the majority of the variables within the PMT correlated strongly with themselves. However, only a moderately positive relationship existed between the PMT pretests and posttests.

Similar correlations existed among the variables in the pretests and posttests of the ECT as well as between the ECT pretest and posttest variables. The items within the ECT pretests correlated strongly with each other; as well, the ECT posttests correlated highly with each other. However, the Pearson coefficients showed only a low positive relationship between the pretest and posttest ECT variables.

The pretest tonal measures of the PMMA did not have a significant relationship with either of the pretest or posttests of the PMT or ECT. However, the posttest tonal measures of the PMMA showed a moderately positive relationship with both pretests and posttests of the PMT. The tonal PMMA did not show any significant correlation with the ECT measures.

The pretest rhythmic measures of the PMMA showed a low positive correlation with the pretest and posttest PMT; Similarly, the PMMA rhythmic pretest had a low significant relationship with the the ECT pretest; the PMMA rhythmic pretest did not correlate with the ECT posttest. The rhythmic PMMA posttests did not correlate with either the pretest or posttest of the PMT. Results showed a minor positive relationship with the ECT pretest but not a significant correlation with the ECT posttest.

Overall Comparison of the Programs

Organization of Classroom

The classroom settings of the pupils in the Kodaly-based music program and the traditional music program were diverse in character and organization. The Kodaly-based program was unique in that the instruction was carried out in a specialized music room. Instructional charts, bulletin boards, musical instruments and audio-visual materials visually and aurally focused the child's attention to music. The traditional music program was instructed in the regular classroom setting. Here, the child viewed music as an integral part of daily life; music could be found at the listening centre, in a song to accompany one of the story books, or during a singing game. These unique settings suggest for the child different views of music that were inherent in the teachers' philosophies. The specialized setting portrays the perception that music is a discrete discipline that acts as a part of daily life while the classroom setting suggests that music is an integral part of daily life. This is a fundamental difference between the two groups.

The seating arrangement for the majority of the music instruction was also different. The pupils in the Kodaly-based program gathered in a broad arc around the teacher focal point while in the traditional classroom, students frequently sat in a circle format. The external observers noted that, in the Kodaly-based program, students were focused on the tasks at hand while, in the classroom program, pupils tended to look at each other rather than at a teacher focal point. The broad arc arrangement seems to be the most appropriate seating design to encourage focused individual pupil attention. However, the circle format provides a warm receptive feeling for the individual as part of the group; the circle encourages each child to become an integral part of the group.

The strategies of each of the teachers' instructional techniques were related to the type of seating arrangements used. The teacher of the Kodaly-based program oriented the music activities towards the music skill development of the individual. The broad arc seating facilitated the individual student's focus on the teacher's instruction. In the traditional classroom program, the teacher employed primarily group oriented music activities encouraging pupil enjoyment. The circle format promoted group interaction within the classroom.

Teaching Techniques

The instructional techniques employed by the teachers in their respective classes was just as diverse as the settings of each of the classrooms.

Teaching of songs. The singing of songs is indigenous to most early elementary music programs. In these two programs the internal and external observers reported new rote song material taught in diverse ways. The teacher of the Kodaly-based program taught each new song by singing a capella (without accompaniment of an instrument). Each line would be sung at a time and the children would echo back. Once the song was learned, the children sang it many times a capella. Occasionally when the song was thoroughly learned, the piano or other instruments might be used to accompany the song as a culmination to the lesson. In the traditional general music program, the teacher sang each new rote song while playing on the piano. The teacher would play one line at a time on the piano and the children would sing by rote. Once the song was learned in its entirety, the teacher would play the piano in accompaniment with the children singing.

Pitch Matching Techniques. The type of pitch matching exercises and the style of remediation were different between the two teachers. Both teachers used the attendance roll call as a way to monitor the daily progress in pitch matching abilities of each individual kindergarten child. If the child pitch matched correctly, both teachers would positively reinforce the child's achievement. However, it is in the remediation of pitch matching that the teachers differed in technique.

The teacher in the Kodaly-based program varied the starting pitches of the tone calls. If the child was unsuccessful, the teacher provided immediate remediation by sliding from where the child sang to the desired pitch. All efforts and achievements were positively reinforced.

The teacher in the traditional music program also sang a roll call each school day. If the child was unsuccessful, the teacher would note that assistance in pitch matching was required. At a later time, the teacher would draw the child aside to the piano. The teacher would play the note on the piano; then help the child sing from the low end to the high end of his/her range and assist him/her in singing the desired note. As noted earlier, occasionally, the teacher would sing into the child's ear to help in pitch matching.

Echo Clapping Techniques. While the pitch matching teaching techniques were different, so also were the rhythmic discrimination and performance activities. Both teachers frequently utilized echo clapping as a simple rhythmic discrimination and performance exercise. In the traditional music program, the teacher used simple four beat echo claps for the children to reproduce. The teacher in the Kodaly-based music program utilized similar simple rhythmic patterns but the instruction was supplemented with the corresponding rhythmic time names.

The melodic and rhythmic teaching techniques were indeed diverse in each of the kindergarten classrooms.

Evaluation Procedures

The pupil evaluation procedures employed by each teacher possessed similarities and differences. Both teachers utilized formative evaluation coupled with positive reinforcement to promote student growth. In both classes the external and internal observers noted a high degree of pupil enjoyment; teachers and children alike exhibited a genuine love of music. However, it is in the summative evaluation area that the greatest difference occurs.

For the summative reporting to parents, the teacher of the traditional music program used a checklist to evaluate each child pertaining to the child's enjoyment and participation in music activities. The teacher of the Kodaly-based music program completed a music skills growth and development checklist for each child. These objectives included rhythmic and melodic outcomes (see Appendix D).

Music Philosophy

The settings and teaching techniques have both provided areas of comparison of the two programs. The music philosophies of each of the teachers added to the diversity of the instructional programs.

The traditional music program centred around group singing and the pupil enjoyment of music making. The teacher was of the philosophy that primary teachers should have a background in music and share that with their children. Fun was the global concept in this teacher's philosophy. Children were encouraged to improve through positive reinforcement.

The Kodaly-based music program contrasted the traditional music program with an orientation towards the music skill development of the individual. Enjoyment of love of music was basic here, too, and this was achieved through positive reinforcement of student behaviours. Students were nurtured to become independent learners but also to be aware of how to work in a group as well.

Interactions with students

The teacher in the Kodaly-based employed large group, small group and individual strategies in the class; the focus in the Kodaly-based class was on the individual as part of a group. The teacher in the traditional classroom primarily used large group instruction with some individual activities in pitch matching.

The distinctive philosophical difference between the programs lies with the focus on the group in the traditional music program while in the Kodaly-based program the focus was on the individual as part of a group. This difference was clearly outlined in the ethnographers' observations.

Summary of Results

The ethnographic descriptions gathered from the field notes of external and internal observers and interviews show the similarities and contrasts between Kodaly-based music instruction and traditional music instruction at the kindergarten level. It was found that the programs differed in their organization, teaching techniques employed, philosophy of music education and interactions with individual pupils.

From the interviews with individual pupils, it was found that both groups of children had similar home musical backgrounds. Minimal formal preschool musical experiences were the norm.

In the PMMA analysis, it was found that both groups showed significant gain from the pretest to the posttest in both tonal and rhythmic discrimination measures. However, there was no signficant difference between the groups for either the tonal or the rhythmic measures. In analyzing the PMT results, it was found that the pupils from the Kodaly-based instruction were a more homogenous group and could pitch match significantly better than students from the traditional music classroom. In examining the ECT findings, it was concluded that the students from the Kodaly-based programming could echo clap significantly better than the pupils in the traditional music program. Furthermore, it was found that the tests of the PMMA and those of the PMT and ECT were indeed measuring different musical aptitudes or behaviours.

The classroom practices mirror the statistical findings. In a program where individualized attention is given to the production of melody and rhythm (Kodaly-based instruction), it is not surprising that students would excel in those areas. However, no significant differences were found in the discrimination measures, leading one to surmise that in music programs where children are given opportunities to listen to, enjoy, and sing songs, pupils will learn to discriminate melody and rhythm regardless of which of the two instructional methods was employed.

The preceding 'beginnings' provide abundant avenues for further consideration. A discussion of these results and the possible inherent implications for music education follow in the next chapter.

CHAPTER 5

DISCUSSION AND IMPLICATIONS

And friendly free discussion, calling forth
from the fair jewel, Truth, its latent ray.

James Thomson,
Liberty

In this chapter, the results described in the prior chapter will be re-examined to suggest possible implications for music education. First, a summary of the quantitative findings will be discussed. This will be followed by a discussion of the appropriateness of each of the measures: Primary Measures of Music Audiation, Pitch Matching Test, and Echo Clapping Test. Then, the two programs will be compared in relation to the results on the organization of classroom, teaching techniques, music philosophy, interactions with individual students, and interviews with pupils. The limitations of the present study will follow and the chapter will conclude with a discussion of the possible implications for future research and music education.

Summary of Quantitative Findings

The results of the rhythmic and tonal sections of the Primary Measures of Music Audiation (Gordon, 1986) suggest that both groups showed significant gain from the pretest to the posttest. There were no significant differences between the groups for either the tonal or the rhythmic measures. The results suggest that pitch and rhythmic discrimination skills of children improve with their natural maturation and chronological age and with some music teaching.

These findings support those reported earlier by Jordan-DeCarbo (1982), Klanderman (1979), and Petzold (1969). Auditory perception and auditory discrimination skills seem to improve with the natural maturation and chronological age of the child.

As both groups demonstrated a gain from the pretest to the posttest in the measures of the Pitch Matching Test (PMT), the results suggest that the ability to pitch match and sing a melody is related to chronological age. This supports findings reported by Drexler (1938) in relation to preschool children.

Further, the accuracy of pitch matching is dependent on musical background and training (Madsen, 1966; Boardman, 1964). As both the Kodaly-based instructional group and traditional music classroom group had similar home musical backgrounds and received pitch matching practice in each class meeting, it seems pertinent to comparatively evaluate the pitch matching procedures of the teachers involved.

The Kodaly (Group A) teacher employed an individual pitch matching exercise as a means for taking attendance in each class. The teacher varied the starting pitches for each pupil. If the child accurately pitch matched, the teacher provided positive verbal reinforcement. If the child was unsuccessful, the teacher provided remediation by modelling a vocal slide from the pupil's incorrect pitch to the desired pitch. Then the pitch matching example was readministered. All efforts and achievements were positively reinforced.

The traditional (Group B) teacher employed pitch matching as a means for taking attendance in each class too. If the child accurately pitch matched, the teacher provided positive reinforcement. If the child was unsuccessful, the teacher might sing the desired pitches into the child's ear or notate in a notebook for remediation at a subsequent time. Later, the teacher would draw a child requiring pitch matching remediation aside to the piano. The teacher would play the desired pitches on the piano and help the child to sing from the low to high pitches and back and find the notes in between.

In comparing these two approaches, it seems logical to suggest that young children respond best in pitch matching to appropriate vocal models rather than instrumental models. Also, it appears remediation in pitch matching is better accomplished by the teacher providing a model of a vocal slide from the pupil's given pitch to the desired pitch rather than reiterating the desired pitch in close proximity to the child's ear.

Previous research has investigated the use of male and female vocal models on children's pitch matching responses. While Small & McCachern (1983) reported that first grade subjects could generally match pitch equally well with male or female models, little research has investigated the effect of the male falsetto voice on pitch matching accuracy of young children. In the present study the male investigator used the falsetto voice as a model during the administration of the pitch matching test. While the students in Group A were more accustomed to hearing the male falsetto voice during the regular teaching by the investigator, the pupils in Group B were accustomed to hearing a female vocal model from their teacher. Further investigation of the role that male and female vocal models affect children's pitch matching accuracy seems advisable.

An analysis of the items on the Pitch Matching Test showed that most children performed the intervals of rising and falling seconds and thirds well. The items encompassed a range from D - A (above middle C). These results reaffirmed those reported by Klanderman (1979) and Zwissler (1972).

The PMT items used a mixture of words and neutral vowel sounds with an initial consonant. Upon closer examination, the effect of group was not significant in 5 of the 6 items using words. These items contained a variety of vowel and consonant sounds. However, the effect of Group A over Group B was significant in all 4 of the items using the neutral vowel sound "oo" with the initial consonant "t". This may possibly suggest that for pitch matching with young children, the forward vowel sound "oo" is more appropriate. It could also suggest that neutral vowel sounds with an initial consonant may be more appropriate than words for pitch matching items with kindergarten children. As children at this age are continuing in their speech and language development, the use of words for pitch matching items may not be appropriate as the child's concentration may be more directed to the language achievement rather than the matching of pitch.

Moreover, the results of the means, standard deviations and multiple linear regressions of Pitch Matching Test suggest that the pupils from the Kodaly-based music instructional group were a more homogenous group and could pitch match significantly better than pupils from the traditional music classroom. These results support those reported earlier by Zemke (1973) and Apfelstadt (1984).

In summary, the results of the PMT suggest that pitch matching is related to the natural maturation of the child and chronological age. Also, that the accuracy of pitch matching is dependent upon training procedures. It was found that children performed intervals of rising and falling seconds and thirds well and that the neutral vowel sound "oo" with an initial consonant "t" appears to be more appropriate for pitch matching with young children. Moreover, the pupils from the Kodaly-based program were more of a homogenous group and could pitch match significantly better than pupils from the traditional music classroom.

The results of the Echo Clapping Test suggest that the rhythmic performance abilities of children are influenced by natural maturation and chronological age. Both groups demonstrated a gain from the pretest to the posttest of the ECT. These findings support those reported in recent research (cf. Gilbert, 1980; Kerr, 1975; Klanderman, 1979; McDowell, 1974; Rainbow, 1981; Rainbow & Owen, 1979; Schleuter & Schleuter, 1985; and Smoll, 1975).

While the gain from pretest to posttest was significant in seven of the ten measures, there was no significant difference in items one, two, and three. This may be attributed to subject test anxiety or shyness as the ECT was the first individual test administered during both pretest and posttest stages.

In examining the mean scores, standard deviations and the multiple linear regressions of the ECT, it was found that Group A had higher means than the pupils in Group B and the standard deviations of Group A were appreciably lower than Group B. While the students in the Kodaly-based program scored higher than the pupils in the traditional music classroom in all of the ten measures, the difference was significant in six of the ten measures. There was no significant difference between groups for items four, five, six, and eight. This may be attributed to optimum subject performance for both groups of items in the central part of the

10-item test. Perhaps the rhythmic complexity of each of the significant items was within the performance capabilities of the Kodaly-based group while the other four items may have been beyond their level of performance at the posttest stage. These results suggest a need for further research into the rhythmic pattern complexities and the rhythmic performance capabilities of kindergarten pupils.

The gain of the pupils from the Kodaly-based program over the students from the traditional music program in the ECT may be attributed to the use of rhythmic time names as a verbal reinforcement to the aural stimulus of rhythmic echo clapping. This point of conjecture seems to support the findings of Schleuter & Schleuter (1985) in which the verbal chanting of the rhythmic patterns was the most accurate response for young children. Also, the utilization of simple rhythmic reading activities may have assisted the pupils in acquiring better rhythmic perception and performance skills.

In summary, the results of the ECT suggest that rhythmic performance capabilities are influenced by natural maturation and chronological age. Further, the findings indicate that pupils from the Kodaly-based program were more of a homogenous group and could echo clap significantly better than the pupils from the traditional classroom music program. Also, it suggests that a number of students in the traditional music classroom still encountered difficulty in echo clapping simple rhythmic patterns at the conclusion of the study.

Correlation Among the Measures

In analyzing the correlation data it was found that the tests of the PMMA and those of the PMT and ECT were indeed measuring discrete musical aptitudes or behaviours.

In the PMMA, strong pretest-posttest relationships existed within both the rhythmic and tonal sections. Also, the tonal tests correlated strongly to the rhythmic tests. As the PMMA is a standardized instrument, it was expected that the rhythmic and tonal sections would have significant pretest-posttest relationships. However, the strong correlation of the tonal tests with the rhythmic tests was unique. This suggests a possible relationship between rhythmic and tonal discrimination skill acquisition. Further research is needed to determine the actual relationship between these two measures.

On each of the pretests and posttests of the PMT and ECT, the variables correlated strongly with each other. However, only a moderately positive relationship existed between the PMT pretests and posttests and a low positive relationship between the pretest and posttest ECT variables. Further research is needed to determine the pretest-posttest correlative relationships within the PMT variables and the ECT variables.

The pretest tonal measures of the PMMA did not have a significant relationship with either of the ECT or PMT pretests or posttests. However, the posttest of the tonal measure of the PMMA showed a moderately positive relationship with both the pretest and posttest of the PMT.

Although the PMMA and PMT seem to be measuring different musical aptitudes or behaviours, the PMMA posttest results suggest a moderately positive relationship between pitch discrimination and vocal pitch matching. This supports a notion of conjecture by Geringer (1983) that maturation and training may have a developmental effect on the relationship of pitch discrimination and pitch matching. Further investigation seems advisable to describe the nature of the relationship between pitch discrimination and pitch matching.

The PMMA pretest rhythmic measures showed a low significant relationship with the ECT pretest; the PMMA rhythmic pretest did not correlate with the ECT posttest. In the PMMA rhythmic posttest, results showed a minor positive relationship with the ECT pretest but did not correlate with the ECT posttest. These results suggest that the behaviours of rhythmic discrimination and the rhythmic performance skill of echo clapping are indeed discrete behaviours.

The results showed low positive relationship or no correlation between both rhythmic discrimination and pitch matching tests as well as pitch discrimination and echo clapping tests. The crossover relationship of rhythmic and tonal measures was low. The tonal PMMA did not show any significant correlation with the ECT measures. The pretest rhythmic measures of the PMMA showed a low positive correlation with the PMT pretest and posttest; the PMMA rhythmic posttests did not correlate with either the pretest or posttest of the PMT. These results suggest that the rhythmic discrimination and pitch matching are not related and that pitch discrimination and echo clapping are also independent musical aptitudes or behaviours.

Appropriateness of the Quantitative Measures

The validity and reliability of the quantitative measures used in the present study merits discussion.

This section will focus on the appropriateness of the Primary Measures of Music Audiation, the Pitch Matching Test, and the Echo Clapping Test.

The data regarding validity and reliability of the PMMA as reported earlier suggest that the PMMA is appropriate for use with children in the grades for which they were designed and can be depended on to provide consistent data relating to rhythmic and pitch discrimination. However, during the administration of the pretest and posttest of the PMMA certain occurrences warrant discussion at this point.

During the fall of their kindergarten year, the children had not, as yet, become accustomed to pencil and paper activities. They were oriented to discovery through play and manipulative learning activities. During the pretest administration in both classes, the investigator, in conjunction with the classroom teacher and teaching assistants, noted the genuine difficulty children experienced in completing the test. By the end of the school year when posttests were administered, most children had matured to the point where they were able to complete the test with little cuing assistance from either the investigator, classroom teacher or teaching assistant.

The length of the PMMA also created difficulty for the children. In the PMMA manual, Gordon (1986) stated that twenty minutes should be allowed for the complete administration of each of the two tests and that possibly five to ten minutes of additional testing time may be needed with kindergarten children. The majority of children especially during the pretest found the test too long. The attention span for a pencil and paper test of from 20 to 30 minutes in duration seems inappropriate for kindergarten children.

The PMMA presupposes that children understand the concept of sameness/difference and can demonstrate the same and different judgment of the aural stimuli through tactile means of a pencil and paper test. Although research has confirmed that preschool children are capable of discriminating similarities and difference in visual stimuli (Murray & Garrett, 1976; Siegel, 1976), the appropriateness of a pencil and paper same/different discrimination tests with kindergarten children is debatable. In observing the PMMA administration and in analyzing the children's PMMA responses in the present study, the investigator concurs with the results of Klanderman (1979) in which kindergarten children experienced difficulty in the decoding and encoding same/different discrimination of aural stimuli. Further investigation is required to determine kindergarten children's ability to demonstrate auditory discrimination skills through pencil and paper tests.

During the PMMA administration, the children may have miscued a number of items. The PMMA presupposes that each child understands the concept of left to right progression. As children at the early kindergarten level have not as yet begun the reading readiness program, many did not understand the important concept of left to right progression. The pictures used in the PMMA to help children locate the next item were indeed of great assistance to many of the children, however, there were odd occurrences where a certain child did not correctly match the aural word to the corresponding picture on the answer sheet. The three proctors had to closely monitor each child to ensure he/she was answering the appropriate item. Despite this assistance, there may have been some children that miscued items.

Miscuing may also have resulted from the repetition of item pictures on the pupil's answer sheet. For example, on page 2 of the tonal answer sheet the following pictures were repeated: hat, cup, book, leaf, apple, knife, and pencil. In a test with older children, this could be analogous to repeating item numbers (i.e. #1, #2, #3, #1, #4 etc). The three proctors had to closely watch the children to ensure that some items were not answered twice.

The difficulty of response biases due to acquiescence of the children's responses in the tonal and rhythmic sections of the PMMA greatly reduces the reliability of the results. With a minimum of analysis, it was determined that in the rhythmic and tonal pretest seven different pupils in the Group A and six distinct students in Group B experienced response bias. In the posttest it was found that four students in Group A and three pupils in Group B answered with response bias. Therefore, due to the large percentage of response biases of acquiescence in both groups, the reliability of the results on the PMMA appears to be greatly diminished.

Therefore, based on the difficulties the subjects experienced in completing the PMMA, its inappropriate length, the question of kindergarten children's ability to effectively decode and encode same/different discrimination of an aural stimuli, the numerous miscuing difficulties with the PMMA and the experienced response biases, it is suggested that future research on auditory discrimination involving kindergarten children include age appropriate tasks for auditory discrimination rather than pencil and paper tests. For example, children might be tested individually and answer orally.

It is now fitting to discuss the suitability of the Pitch Matching Test and Echo Clapping Test. The content validity of the Pitch Matching Test (PMT) and the Echo Clapping Test (ECT) has been clearly outlined earlier in the method chapter. As reported in the results chapter both the PMT and ECT have high reliability alpha coefficients. Using a reliability maximization procedure for Likert scales reported by Ray (1972), it was found that both the PMT and ECT measures could be shortened to six items each for the tests to remain highly reliable. For example, in the PMT, items 10, 9, 3, and 8 could be removed from the measure for the reliability to remain high ($\underline{a}$ = .90). Likewise, in the ECT, items 3, 10, 2, and 1 could be extracted from the measure for the remaining items to be highly reliable ($\underline{a}$ = .81). This finding has suitable application for PMT and ECT administration to young children of kindergarten age. As children at this age have shorter attention spans than older children, it seems that diminishing the number of items in each of the PMT and ECT would be advantageous.

A difficulty arose during the administration of the pretests in the PMT and ECT. It is natural for young children to fail to respond to strangers. Despite the inclusion of the steps for ecological validity and a orientation phase for the children to become accustomed to the investigator and to reduce test anxiety, there were still four pupils from the traditional music program that froze during the administration of the PMT and ECT. The investigator suggests that future research with young children include an extended orientation phase of at least five hours in duration and that the visits be evenly spread over a period of at least three weeks. As in the present study, it is suggested that the tests be administered within or in close proximity to the child's classroom.

Comparison of Programs

As reported earlier in the results chapter, the classroom settings of the pupils in the Kodaly-based music program and the traditional music program were diverse in character and organization. One of the distinct differences was the variance in seating arrangements.

The seating arrangement may have had some effect on the pupils in the Kodaly-based music program over those in the traditional general music program in their achievement on the PMT and ECT. As these music behaviours measured in the PMT and ECT require melodic and rhythmic discrimination and performance abilities, the level of attentional acuity of the children appears to have some effect. It is suggested that further research be undertaken to determine the effect of pupil attentional focus on music skill acquisition.

The amount of teaching time devoted to music instruction warrants discussion. While the students in the traditional music program received 45 to 50 minutes of instruction every second day, the students in the Kodaly-based music program received 20 minutes of instruction every second day. It appears then that based on the results of the PMMA, PMT, and ECT, the amount of teaching time was not a contributing factor in the children's achievement. It seems that the treatment or the teaching style of the instructors had more of an influence.

Both classrooms had a piano. While the teachers utilized these instruments for different pedagogical uses, the tuning of the instruments may have had an effect on the pitch discrimination and pitch matching abilities of the children. The piano for the Group A pupils was regularly maintained and tuned to A-440 while the piano in the Group B class required tuning and was not tuned until the second last month of the study. While the tonal PMMA results reported no significant differences between the groups, the PMT results showed a significant difference of Group A over Group B. The lack of piano tuning relative to a standard pitch like A-440 in the Group B classroom may have adversely affected the development of pitch matching abilities of these kindergarten children. Further research should be undertaken to determine the effect of in-tune instrumental pitch models on the pitch discrimination and pitch matching abilities of young children.

The instructional techniques employed by the teachers in their respective classes was just as diverse as the settings of each of the classrooms. The comparative results of strategies for the teaching of songs merits discussion.

In the results chapter, it was noted that all children in the Kodaly-based group were participating in singing activities while in the traditional general music program not all pupils were singing. It appears then that the rote song teaching technique may affect the teacher's ability to assist pupils in accurately singing in pitch songs that are within the child's singing range. Perhaps the teacher in the traditional classroom had attention focused on piano accompaniment rather than assisting the remediation of singing. In future research, observers might more closely describe the pupil-teacher interactions during the teaching of singing.

Another difference in teaching strategy involved the use of vocal models and instrumental models for singing. The effect of a vocal model versus an instrumental model may have had an effect on the vocal accuracy of young children. Since children in the traditional general music program were used to hearing the piano as a model for singing, perhaps the vocal model of the PMT affected their achievement. Pupils in the Kodaly-based program were accustomed to the use of the vocal model for singing. This may have skewed the PMT results. It seems appropriate then to suggest further research to investigate the effect of vocal and instrumental models on the vocal accuracy of young children.

The type of pitch matching exercises and the style of remediation seems to have an effect on the pitch matching. In analyzing the results from the PMT and the pitch matching techniques, it seems appropriate to conclude that young children learn to pitch match best followed by immediate remediation by the teacher. Also, it appears that the remediation exercise of a vocal slide from the child's pitch to the desired pitch may be a more appropriate way of assisting the child to pitch match accurately.

The pitch matching of the Kodaly-based group may have been positively influenced by the simple melodic reading exercises that were used to reinforce the previous rote learned melodic sequences. The use of the tonic sol-fa and the Kodaly hand signs to represent a visualization in space of the relationship of the notes being sung may have positively affected the pitch matching of the kindergarten children. The use of the hand signs and the singing of the tonic sol-fa demonstrate the ways that the Kodaly-based program helps to reach the visual, aural and kinesthetic learner. The pupils in the traditional music program received only rote aural learning in their pitch matching training. It is this discreet difference in the introduction of simple melodic reading using tonic sol-fa and hand signs that leads one to suggest that the Kodaly-based programming may have positively affected the pitch matching skills of the kindergarten children.

While the results of the pitch matching teaching techniques warranted discussion, so also do the echo clapping instructional techniques merit debate. The results stated that although both teachers frequently utilized echo clapping as a simple rhythmic discrimination and performance exercise, it was only in the Kodaly program that the clapping of rhythmic patterns was supplemented with the verbal rhythmic time names. The rhythmic time names may have aided the children in decoding the perceived rhythmic patterns and may have assisted in transmitting the message into the kinesthetic clap. Also, the implementation of simple rhythmic reading patterns accompanied by the aural rhythmic time names as a regular activity in the Kodaly-based class may have especially assisted the visual learners. Therefore, these results reported by the external observers and supported by the results of the ECT suggest that kindergarten pupils taught music through a Kodaly-based program can echo clap appreciably better than kindergarten students studying music in a traditional music classroom.

The melodic and rhythmic teaching techniques were indeed diverse in each of the kindergarten classrooms. It seems appropriate to conclude that the teaching style and pedagogical techniques of the teachers in the present study had a contributing effect on pupil achievement in pitch matching and echo clapping.

Another contributing effect on pupil achievement is the area of student evaluation. The results on the evaluation procedures stated that both teachers utilized formative evaluation coupled with positive reinforcement. However, in the summative evaluation area, the traditional program stressed enjoyment and participation while the Kodaly-based program concentrated on music skill development.

Therefore, it seems appropriate to conclude that if parents are to value the music program as an integral part of their child's emotional, social, physical and intellectual development, then the student reporting procedures should include components of enjoyment, participation and music skill development.

The instructional and evaluative techniques of each of the teachers were governed by their inherent philosophies. The diversity of these philosophies contributed to the distinctiveness of the two music programs. While the traditional music program focused on group singing and student enjoyment and the Kodaly-based music program on individual music skill development, both teachers fostered a love of music making in the experiences provided for pupils in each of the classrooms. It is recommended that future studies be undertaken to determine the effect of teachers' overall philosophies on pupil enjoyment and achievement.

The distinctive philosophical difference between the programs lies with the focus on the group in the traditional music program while in the Kodaly-based program the focus was on the individual as part of a group. Further research is needed to investigate group dynamics in music classrooms and the effect that group/individual interactions have on student achievement.

Also, in comparing the two programs, the results obtained from the pupil interviews regarding the home musical background of the children merits discussion. The results of the child interviews suggest that both the Kodaly-based music group and the traditional music group had similar home musical backgrounds. Singing in the home setting did not appear to be highly regarded by parents as an integral part in the child's development. This suggests that preschool and kindergarten educators need to ensure that children within their care receive a wide variety of singing experiences to encourage the musical development of each child.

As both groups of children had similar experiences with musical instruments in a play discovery mode in the home setting, it appears that parents reasonably valued the use of musical instruments as a creative avenue to musical development in their children.

In comparing the results of the parental singing question with those of the musical instrument, one might surmise that parents of children in the Kodaly-based music program were either more oriented toward instrumental music or were more inclined for their children to experience music through the play discovery mode. Perhaps time limitations due to employment or family obligations may have had some effect on the low response in the parents' singing of songs to their children.

The low involvement of children in private music lessons outside of school may be attributed to a number of factors. The socioeconomic background of the children in these rural settings may affect parental interest in private music tuition. As well, the young age of the children may be a determining factor.

While Petzold (1969) found that musical training and out-of-school musical experiences played a significant factor in the development of auditory perception, the connection in the present study appears to be nebulous. However, it has been reported that the musical experiences within the environment of the young child have a controlling influence on the musical development of the child (Simons, 1968). For some children, the home setting is a rich musical learning environment. However, the first formal music education for some children commences with the start of kindergarten classes. Many children are leaving the home setting at an earlier age. More and more children are beginning education earlier in the ever-growing number of day-care and preschool facilities across North America as the communities and employers strive to meet the custodial and educational child care needs of dually employed parents and single parents alike.

Therefore, it is becoming increasingly important that our child care givers and early childhood education instructors acquire knowledge and skill of early childhood music education to cultivate the preschool musical development of the child. Preschool educators need to become more cognizant of early childhood music education research and the inherent implications for preschool education.

Limitations of the Study

The appropriateness of the PMMA, PMT, and ECT as valid instruments of measurement to compare the two music programs as far as auditory discrimination and production of melodic and rhythmic fragments has previously been discussed. However, as the PMT and ECT are both skill-oriented measures, perhaps some other measures could have been developed to better evaluate other dimensions of the music learning that occurred in the traditional music program as well as in the Kodaly-based skill developmental music program. For example, the children in the traditional music program listened to many more examples of music throughout the school day than the Kodaly-based pupils experienced in their music class. Perhaps the pupils from the traditional program may have developed a deeper affective response to music. Further research is required to determine appropriate measures for evaluating and measuring various aspects of musical learning and ability of young children, in addition to those measured in the present study.

The limitations of the design of the study merit discussion. The results of the study may be limited due to contamination biases created by the involvement of the investigator as the music teacher of the Kodaly-based group. The greater familiarity of the children in the Kodaly-based program with the investigator may have skewed the results. However, it is arguable that contamination from this source was limited since most of the children in the traditional classroom seemed comfortable during testing.

The limitations of the pupil interviews also warrant discussion. While the questions asked during the present study provided useful data for comparing the two groups, the questions did not delve deeply enough to investigate possible affects of home musical background on the musical development of the child. This points to the need for additional research. Further, it is recommended that future research might possibly involve interviews with parents or questionnaires on parental attitudes toward various aspects of music education.

There were also limitations experienced during the collection of the qualitative data. As reported earlier, the ethnographic data collected by the external observers was rich in nature. However, the data collected by the internal observer team were not as rich as hoped.

The internal observer team consisted of the principal of each of the respective schools. In order to acquaint these observers with field study techniques, the two principals received three training sessions in ethnographic observation. Despite these training sessions, the observers tended to follow more of a teacher evaluation model than a analytic description of the cultural scenes in each class. The field notes notated by the internal observers were fine beginnings in ethnographic collection but further training would be required in order for the written observations to be richer in nature. It is suggested that in future research where inexperienced individuals act as ethnographers, more in-depth training be provided.

During the visits by the internal observer team, another problem arose. In general, principals of schools tend to be active and involved administrators. They are in charge of the instruction and discipline of the pupils in the school and oversee the organization and day to day management of the school. While the principals were sincere in their efforts, due to unforeseen administrative circumstances, the team only managed to meet 7 of the 14 scheduled classroom visits. As a result, without the rich input of the external observer team, the ethnographic data of the present study would have been inconclusive. However, the involvement of the principals as observers was indeed an in-service learning experience for the principals concerned. They garnered a deeper understanding of each of the two music programs and observed first hand the unique teaching styles and pupil interactions of the teaching professionals involved in the study. This type of involvement helps bridge the gap between the researcher and the practitioner; it is through practical experiences of observation that our future administrators will value the effect of educational research. It is recommended that future ethnographic research of school-based programming involve trained school administrators as ethnographers in addition to external observers.

Summary of Implications

The implications of the present study are important both for further research and music teaching. The first section will summarize the implications for further research and the implications for music education will follow.

Implications for Further Research

The implications for further research may be divided in four areas: auditory discrimination, melodic performance, rhythmic performance and ethnographic methods.

In the area of auditory discrimination, the findings of the PMMA suggest that further research is needed to determine the actual relationship between the tonal and rhythmic subtests of this auditory discrimination measure. However, it is suggested that future research involving kindergarten children should include age appropriate tasks for auditory discrimination rather than pencil and paper tests. Also, future research may possibly examine the nature of the relationship between pitch discrimination and pitch matching. This may include studies investigating the effect of in-tune instrumental pitch models on the pitch discrimination and pitch matching abilities of young children.

Findings of the present study also suggest further research into other types of models for the pitch matching of young children. It is suggested that the role that male and female vocal models affect children's pitch matching accuracy may be investigated. Also, it is recommended that future studies examine the effect of vocal and instrumental models on the vocal accuracy of young children.

As the pitch performance area findings yielded suggestions for further research, the rhythmic performance results did as well. The results suggested a need for further research into the rhythmic pattern complexities and the rhythmic performance capabilities of kindergarten children.

In addition, the findings of the present study suggest that in further research with kindergarten age children, an orientation phase to acquaint the children with the investigator be at least five hours in duration spread over a period of three weeks prior to the administration of rhythmic and pitch performance tests.

While the results of the quantitative measures of the present study produced further research recommendations, the qualitative section of the design of the present study yielded research implications as well. It is suggested that future ethnographic research of school-based programming involve trained school administrators as well as as external experienced ethnographers. It is further recommended that if inexperienced individuals assume the role of observers, more in-depth training should be provided.

The findings of the present study generated several recommendations for possible ethnographic research in music education. It is recommended that further studies be undertaken to investigate the effect of teachers' overall philosophies on pupil enjoyment and achievement. One area of further research may involve group dynamics in music classrooms and the effect that group/individual interactions have on student achievement.

Overall, the findings indicate that further research is required to determine appropriate measures for evaluating various aspects of musical learning and ability of young children.

Implications for Music Education

In addition to the implications for research, the findings of the present study suggest recommendations for music teaching at the early elementary school level. These implications have prime importance in the areas of tonal and rhythmic performance skills and pupil evaluation in music.

The findings of the present study suggest optimal pedagogical techniques for helping kindergarten age children to sing and accurately pitch match. A wide variety of singing experiences are basic to many early elementary music programs. The results suggest that since many preschool age children do not receive vocal music modelling in the home setting, it is of supreme importance that early childhood educators need to ensure that children within their care receive a wide variety of singing experiences to encourage the musical development of the child.

Regarding pitch matching teaching techniques, it appears that young children learn to pitch match through immediate remediation by the teacher. The results suggest that vocal models are more appropriate than instrumental models for young children to match pitches. The findings imply that pitch matching is better accomplished by the teacher providing a singing model of a vocal slide from the pupil's given pitch to the desired pitch rather than reiterating the desired pitch in close proximity to the child's ear. The results seem to suggest that singing pitches to the vowel sound "oo" is more appropriate for pitch matching strategies with kindergarten age children. Also, neutral vowel sounds with an initial consonant may be more appropriate than words for pitch matching items with young children.

Above all, the results of the present study appear to indicate that kindergarten age pupils who receive instruction through a Kodaly-based developmental music program sequence seem to pitch match better than students from a traditional music program.

Likewise, the findings appear to indicate that young children who receive instruction through a Kodaly-based developmental music program echo clap better than pupils from a traditional music program.

Further, the results of the study suggest that if parents are to value the elementary school music program as an integral part of their child's total development, pupil reporting procedures should include components of music skill development as well as enjoyment and participation.

Summary

The present study has compared two instructional programs of music education at the kindergarten level: a Kodaly-based developmental music program and a traditional music program. The two programs contained many discrete differences and some similarities; the results, the discussions on the findings and the inherent implications for music education and music education research have been herein accounted.

Furthermore, it was found that both teachers in the Kodaly-based developmental music program and the traditional music program provided pupils in their classes with aesthetic experiences in music.

Children's love of music was reinforced. Through the guidance and instruction of caring teaching professionals, the pupils gained a deeper understanding of the feelingfulness that the joy of music can bring.

As we delve deeper into the processes of music learning and the pupil-teacher interactions in music classrooms, we need to bear in mind the words of eminent Hungarian composer and educator, Zoltan Kodaly (1974):

> Only the best is good enough for a child (p. 148).

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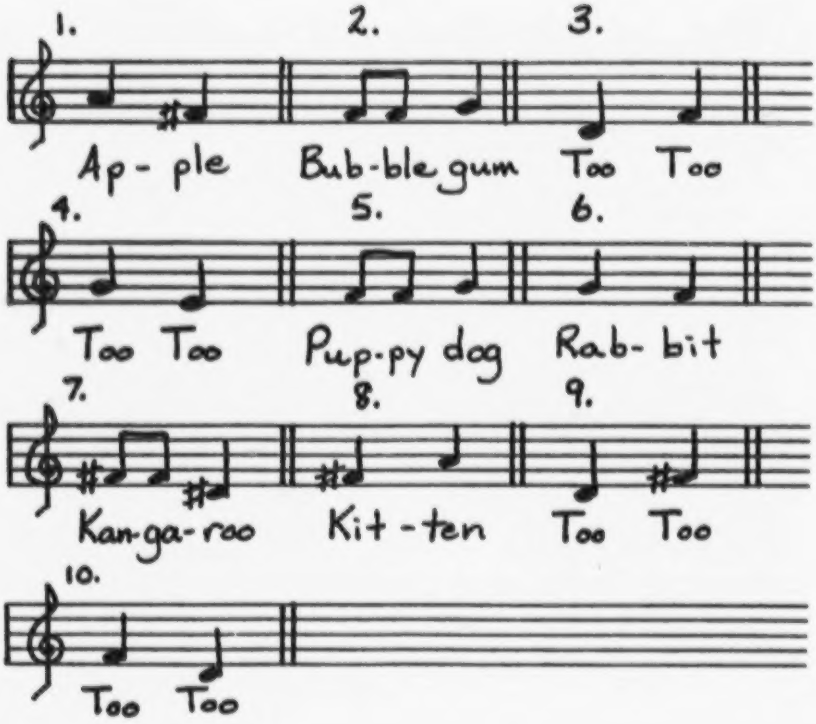
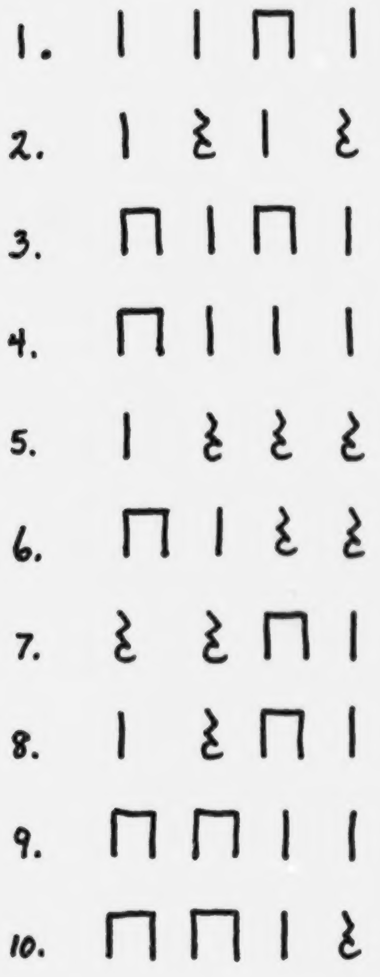
APPENDIX A

PITCH MATCHING TEST


1.
2.
3.
Ap - ple
Bub-ble gum
Too Too
4.
5.
6.
Too Too
Pup-py dog
Rab- bit
7.
8.
9.
Kan-ga-roo
Kit - ten
Too Too
10.
Too Too

APPENDIX B

ECHO CLAPPING TEST


1.
2.
3.
4.
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6.
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8.
9.
10.

APPENDIX C

INTERNAL OBSERVER GUIDELINES

1. Who? Group or Scene: number, identities, characteristics, membership

2. What? Behaviours: repetitive or irregular?
resources used/allocated
activities
Group Behaviour and Interaction
status and roles of participants
decisionmakers - who?
organization
Content
subjects - common/rare
languages used - verbal/nonverbal
formats
who talks?/ who listens?

3. Where? Location and Physical Setting
natural and technological resources
use of space and physical objects
consumed/produced what?
sensory use

4. When?	Time - length time concept, use and distribution view of past and future
5. How?	Interrelation/Connection of Elements - from the view of participant or researcher Rules, Norms or Mores of Social Group
6. Why?	why does group operate as it does?

APPENDIX D

KINDERGARTEN SKILLS CHECKLIST - GROUP A

Evaluation Key:

M = most of the time N = not yet

S = some of the time NA = not applicable at this time

MUSIC

The student has demonstrated an ability to:

	March	June
- distinguish between beat and rhythm		
- clap echoes of four-beat rhythmic patterns		
- use handsigns to represent the falling third (soh-me)		

- sing echoes of four-beat melodies			
- sing at least 20 songs			
- answer in tune (at a variety of pitches) a simple soh-me question			

APPENDIX E

PEARSON CORRELATION MATRIX

	PMMATPRE	PMMATPST	PMMARPRE	PMMARPST	PMT1PRE
PMMATPRE	1.00 *				
PMMATPST	0.71 *	1.00 *			
PMMARPRE	0.80 *	0.70 *	1.00 *		
PMMARPST	0.75 *	0.72 *	0.70 *	1.00 *	
PMT1PRE	0.33 *	0.48 *	0.43 *	0.31	1.00 *
PMT2PRE	0.34 *	0.47 *	0.47 *	0.32 *	0.86 *
PMT3PRE	0.35 *	0.40 *	0.33 *	0.18	0.71 *
PMT4PRE	0.21	0.48 *	0.34 *	0.18	0.77 *
PMT5PRE	0.24	0.44 *	0.37 *	0.16	0.79 *
PMT6PRE	0.23	0.45 *	0.33 *	0.22	0.82 *
PMT7PRE	0.33 *	0.48 *	0.51 *	0.30	0.83 *
PMT8PRE	0.22	0.39 *	0.35 *	0.21	0.78 *
PMT9PRE	0.30	0.30	0.47 *	0.23	0.47 *
PMT10PRE	0.27	0.33 *	0.35 *	0.23	0.46 *

* Significant at the .05 level

PEARSON CORRELATION MATRIX

	PMMATPRE	PMMATPST	PMMARPRE	PMMARPST	PMT1PRE
PMT1PST	0.34 *	0.34 *	0.41 *	0.23	0.38 *
PMT2PST	0.27	0.32 *	0.30	0.20	0.37 *
PMT3PST	0.44 *	0.42 *	0.48 *	0.40 *	0.49 *
PMT4PST	0.36 *	0.37 *	0.34 *	0.34 *	0.50 *
PMT5PST	0.27	0.28	0.31	0.12	0.45 *
PMT6PST	0.27	0.37 *	0.46 *	0.30	0.49 *
PMT7PST	0.20	0.27	0.37 *	0.22	0.46 *
PMT8PST	0.39 *	0.41 *	0.42 *	0.40 *	0.48 *
PMT9PST	0.36 *	0.29	0.50 *	0.40 *	0.39 *
PMT10PST	0.05	-0.05	0.11	0.18	0.24
ECT1PRE	0.24	0.18	0.35 *	0.18	0.45 *
ECT2PRE	0.33 *	0.09	0.25	0.40 *	0.18
ECT3PRE	0.26	0.13	0.28	0.29	0.36 *
ECT4PRE	0.27	0.28	0.37 *	0.41 *	0.52 *
ECT5PRE	0.48 *	0.36 *	0.44 *	0.51 *	0.40 *
ECT6PRE	0.33 *	0.38 *	0.32 *	0.48 *	0.53 *
ECT7PRE	0.29	0.35 *	0.23	0.33 *	0.49 *

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMMATPRE	PMMATPST	PMMARPRE	PMMARPST	PMT1PRE
ECT8PRE	0.50 *	0.29	0.43 *	0.37 *	0.41 *
ECT9PRE	0.32 *	0.25	0.30	0.36 *	0.55 *
ECT10PRE	0.45 *	0.41 *	0.38 *	0.46 *	0.49 *
ECT1PST	0.12	0.14	0.11	0.18	0.13
ECT2PST	-0.19	-0.09	-0.15	-0.20	0.29
ECT3PST	0.02	0.17	0.13	0.24	0.17
ECT4PST	0.25	0.31	0.30	0.37 *	0.39 *
ECT5PST	0.21	0.19	0.23	0.25	0.14
ECT6PST	0.01	0.07	0.00	0.30	0.07
ECT7PST	0.19	0.19	0.19	0.25	0.43 *
ECT8PST	0.22	0.30	0.17	0.31	0.30
ECT9PST	0.17	0.17	0.31	0.26	0.43 *
ECT10PST	0.21	0.28	0.26	0.34 *	0.42 *
GROUP	0.32	0.26	0.13	0.22	-0.08

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMT2PRE	PMT3PRE	PMT4PRE	PMT5PRE	PMT6PRE
PMT2PRE	1.00 *				
PMT3PRE	0.76 *	1.00 *			
PMT4PRE	0.78 *	0.75 *	1.00 *		
PMT5PRE	0.81 *	0.77 *	0.85 *	1.00 *	
PMT6PRE	0.87 *	0.73 *	0.84 *	0.87 *	1.00 *
PMT7PRE	0.84 *	0.69 *	0.85 *	0.86 *	0.84 *
PMT8PRE	0.76 *	0.66 *	0.79 *	0.83 *	0.83 *
PMT9PRE	0.54 *	0.50 *	0.50 *	0.45 *	0.50 *
PMT10PRE	0.52 *	0.52 *	0.45 *	0.43 *	0.46 *
PMT1PST	0.39 *	0.38 *	0.35 *	0.50 *	0.53 *
PMT2PST	0.29	0.29	0.29	0.46 *	0.46 *
PMT3PST	0.47 *	0.45 *	0.52 *	0.61 *	0.54 *
PMT4PST	0.42 *	0.41 *	0.42 *	0.53 *	0.57 *
PMT5PST	0.42 *	0.39 *	0.48 *	0.62 *	0.55 *
PMT6PST	0.44 *	0.21	0.32 *	0.53 *	0.60 *
PMT7PST	0.44 *	0.29	0.37 *	0.50 *	0.53 *

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMT2PRE	PMT3PRE	PMT4PRE	PMT5PRE	PMT6PRE
PMT8PST	0.46 *	0.42 *	0.50 *	0.59 *	0.59 *
PMT9PST	0.44 *	0.34 *	0.29	0.39 *	0.39 *
PMT10PST	0.26	0.19	0.26	0.29	0.26
ECT1PRE	0.37 *	0.36 *	0.20	0.33 *	0.30
ECT2PRE	0.26	0.17	-0.02	0.10	0.17
ECT3PRE	0.35 *	0.10	0.16	0.22	0.28
ECT4PRE	0.50 *	0.35 *	0.37 *	0.45 *	0.50 *
ECT5PRE	0.48 *	0.46 *	0.34 *	0.42 *	0.43 *
ECT6PRE	0.45 *	0.41 *	0.27	0.38 *	0.39 *
ECT7PRE	0.50 *	0.39 *	0.38 *	0.46 *	0.50 *
ECT8PRE	0.49 *	0.44 *	0.31	0.41 *	0.37 *
ECT9PRE	0.56 *	0.61 *	0.54 *	0.58 *	0.55 *
ECT10PRE	0.38 *	0.36 *	0.33 *	0.38 *	0.38 *
ECT1PST	0.21	0.26	0.15	0.18	0.25
ECT2PST	0.23	0.19	0.22	0.25	0.23
ECT3PST	0.26	0.30	0.22	0.20	0.32 *
ECT4PST	0.33 *	0.30	0.18	0.36 *	0.37 *

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMT2PRE	PMT3PRE	PMT4PRE	PMT5PRE	PMT6PRE
ECT5PST	0.09	0.02	0.12	0.22	0.18
ECT6PST	0.09	0.01	-0.06	-0.04	0.11
ECT7PST	0.46 *	0.47 *	0.22	0.36 *	0.48 *
ECT8PST	0.24	0.22	0.25	0.23	0.26
ECT9PST	0.45 *	0.28	0.34 *	0.34 *	0.47 *
ECT10PST	0.39 *	0.31	0.25	0.26	0.47 *
GROUP	-0.08	-0.03	0.01	-0.14	-0.12

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMT7PRE	PMT8PRE	PMT9PRE	PMT10PRE	PMT1PST
PMT7PRE	1.00 *				
PMT8PRE	0.86 *	1.00 *			
PMT9PRE	0.53 *	0.36 *	1.00 *		
PMT10PRE	0.49 *	0.49 *	0.67 *	1.00 *	
PMT1PST	0.51 *	0.42 *	0.20	0.20	1.00 *
PMT2PST	0.51 *	0.44 *	0.19	0.26	0.81 *
PMT3PST	0.61 *	0.56 *	0.47 *	0.36 *	0.58 *
PMT4PST	0.58 *	0.60 *	0.29	0.27	0.73 *
PMT5PST	0.67 *	0.57 *	0.33 *	0.35 *	0.73 *
PMT6PST	0.57 *	0.55 *	0.25	0.17	0.74 *
PMT7PST	0.64 *	0.58 *	0.33 *	0.41 *	0.75 *
PMT8PST	0.62 *	0.66 *	0.34 *	0.44 *	0.69 *
PMT9PST	0.58 *	0.50 *	0.42 *	0.44 *	0.55 *
PMT10PST	0.42 *	0.48 *	0.21	0.35 *	0.36 *
ECT1PRE	0.33 *	0.29	0.53 *	0.46 *	0.29
ECT2PRE	0.06	0.11	0.31	0.14	0.06
ECT3PRE	0.27	0.28	0.34 *	0.24	0.27

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMT7PRE	PMT8PRE	PMT9PRE	PMT10PRE	PMT1PST
ECT4PRE	0.44 *	0.44 *	0.57 *	0.46 *	0.42 *
ECT5PRE	0.46 *	0.34 *	0.51 *	0.32 *	0.31
ECT6PRE	0.38 *	0.33 *	0.50 *	0.50 *	0.24
ECT7PRE	0.38 *	0.42 *	0.43 *	0.35 *	0.30
ECT8PRE	0.37 *	0.36 *	0.31	0.37 *	0.35 *
ECT9PRE	0.60 *	0.59 *	0.56 *	0.58 *	0.34 *
ECT10PRE	0.41 *	0.32 *	0.50 *	0.36 *	0.47 *
ECT1PST	0.26	0.35 *	0.31	0.39 *	0.11
ECT2PST	0.29	0.31	0.06	0.23	0.09
ECT3PST	0.22	0.33 *	0.17	0.25	0.27
ECT4PST	0.31	0.37 *	0.16	0.16	0.45 *
ECT5PST	0.33 *	0.31	0.09	0.03	0.36 *
ECT6PST	0.01	0.08	0.08	0.18	0.22
ECT7PST	0.38 *	0.38 *	0.37 *	0.36 *	0.45 *
ECT8PST	0.24	0.37 *	0.07	0.26	0.10
ECT9PST	0.56 *	0.54 *	0.26	0.34 *	0.62 *
ECT10PST	0.41 *	0.43 *	0.19	0.19	0.61 *
GROUP	-0.07	-0.22	-0.08	-0.14	-0.26

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMT2PST	PMT3PST	PMT4PST	PMT5PST	PMT6PST
PMT2PST	1.00 *				
PMT3PST	0.60 *	1.00 *			
PMT4PST	0.79 *	0.81 *	1.00 *		
PMT5PST	0.79 *	0.70 *	0.75 *	1.00 *	
PMT6PST	0.73 *	0.67 *	0.77 *	0.67 *	1.00 *
PMT7PST	0.76 *	0.55 *	0.75 *	0.73 *	0.79 *
PMT8PST	0.61 *	0.74 *	0.75 *	0.73 *	0.63 *
PMT9PST	0.59 *	0.66 *	0.73 *	0.62 *	0.63 *
PMT10PST	0.45 *	0.59 *	0.57 *	0.51 *	0.43 *
ECT1PRE	0.24	0.36 *	0.26	0.32 *	0.29
ECT2PRE	-0.06	0.21	0.22	0.04	0.19
ECT3PRE	0.14	0.26	0.31	0.29	0.26
ECT4PRE	0.36 *	0.56 *	0.58 *	0.34 *	0.48 *
ECT5PRE	0.32 *	0.42 *	0.42 *	0.27	0.29
ECT6PRE	0.38 *	0.50 *	0.49 *	0.29	0.34 *
ECT7PRE	0.31	0.36 *	0.41 *	0.28	0.30
ECT8PRE	0.20	0.36 *	0.30	0.18	0.16

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMT2PST	PMT3PST	PMT4PST	PMT5PST	PMT6PST
ECT9PRE	0.38 *	0.52 *	0.53 *	0.37 *	0.36 *
ECT10PRE	0.47 *	0.53 *	0.62 *	0.39 *	0.41 *
ECT1PST	0.19	0.36 *	0.40 *	0.19	0.27
ECT2PST	0.18	0.08	0.24	0.32 *	0.13
ECT3PST	0.19	0.39 *	0.47 *	0.07	0.37 *
ECT4PST	0.40 *	0.46 *	0.61 *	0.25	0.61 *
ECT5PST	0.32 *	0.30	0.45 *	0.34 *	0.39 *
ECT6PST	0.19	0.09	0.26	-0.00	0.16
ECT7PST	0.40 *	0.40 *	0.56 *	0.33 *	0.53 *
ECT8PST	0.13	0.29	0.32 *	0.07	0.15
ECT9PST	0.54 *	0.49 *	0.65 *	0.51 *	0.67 *
ECT10PST	0.54 *	0.41 *	0.73 *	0.39 *	0.61 *
GROUP	-0.29	-0.36	-0.39	-0.32	-0.38

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMT7PST	PMT8PST	PMT9PST	PMT10PST	ECT1PRE
PMT7PST	1.00 *				
PMT8PST	0.65 *	1.00 *			
PMT9PST	0.75 *	0.64 *	1.00 *		
PMT10PST	0.55 *	0.59 *	0.70 *	1.00 *	
ECT1PRE	0.28	0.42 *	0.40 *	0.19	1.00 *
ECT2PRE	0.08	0.28	0.29	0.17	0.51 *
ECT3PRE	0.27	0.39 *	0.30	0.16	0.58 *
ECT4PRE	0.45 *	0.58 *	0.52 *	0.42 *	0.62 *
ECT5PRE	0.26	0.41 *	0.49 *	0.16	0.52 *
ECT6PRE	0.29	0.37 *	0.44 *	0.31	0.60 *
ECT7PRE	0.28	0.50 *	0.31	0.20	0.63 *
ECT8PRE	0.22	0.52 *	0.34 *	0.24	0.48 *
ECT9PRE	0.49 *	0.52 *	0.51 *	0.49 *	0.41 *
ECT10PRE	0.50 *	0.49 *	0.43 *	0.29	0.45 *

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	PMT7PST	PMT8PST	PMT9PST	PMT10PST	ECT1PRE
ECT1PST	0.32 *	0.34 *	0.58 *	0.42 *	0.19
ECT2PST	0.24	0.20	0.39 *	0.35 *	0.27
ECT3PST	0.34 *	0.35 *	0.51 *	0.50 *	0.12
ECT4PST	0.46 *	0.37 *	0.59 *	0.39 *	0.37 *
ECT5PST	0.41 *	0.41 *	0.48 *	0.31	0.22
ECT6PST	0.21	0.14	0.31	0.36 *	0.16
ECT7PST	0.54 *	0.39 *	0.64 *	0.45 *	0.38 *
ECT8PST	0.14	0.35 *	0.28	0.27	0.21
ECT9PST	0.76 *	0.55 *	0.72 *	0.62 *	0.25
ECT10PST	0.64 *	0.52 *	0.67 *	0.50 *	0.28
GROUP	-0.26	-0.28	-0.40	-0.54	-0.23

* Significant at the .05 level

PEARSON CORRELATION MATRIX

	ECT2PRE	ECT3PRE	ECT4PRE	ECT5PRE	ECT6PRE
ECT2PRE	1.00 *				
ECT3PRE	0.66 *	1.00 *			
ECT4PRE	0.56 *	0.66 *	1.00 *		
ECT5PRE	0.49 *	0.42 *	0.69 *	1.00 *	
ECT6PRE	0.47 *	0.39 *	0.74 *	0.64 *	1.00 *
ECT7PRE	0.61 *	0.64 *	0.76 *	0.68 *	0.65 *
ECT8PRE	0.55 *	0.50 *	0.61 *	0.55 *	0.44 *
ECT9PRE	0.44 *	0.37 *	0.66 *	0.58 *	0.64 *
ECT10PRE	0.41 *	0.48 *	0.62 *	0.45 *	0.61 *

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	ECT2PRE	ECT3PRE	ECT4PRE	ECT5PRE	ECT6PRE
ECT1PST	0.19	-0.05	0.30	0.38 *	0.30
ECT2PST	-0.02	0.09	0.21	0.20	0.25
ECT3PST	0.32 *	0.09	0.47 *	0.25	0.30
ECT4PST	0.32 *	0.21	0.63 *	0.54 *	0.58 *
ECT5PST	0.01	0.17	0.37 *	0.48 *	0.19
ECT6PST	0.29	0.26	0.38 *	0.20	0.45 *
ECT7PST	0.43 *	0.26	0.54 *	0.43 *	0.52 *
ECT8PST	0.31	0.26	0.45 *	0.27	0.47 *
ECT9PST	0.27	0.32 *	0.44 *	0.26	0.34 *
ECT10PST	0.40 *	0.43 *	0.58 *	0.36 *	0.39 *
GROUP	-0.13	-0.11	-0.36	-0.08	-0.25

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	ECT7PRE	ECT8PRE	ECT9PRE	ECT10PRE	ECT1PST
ECT7PRE	1.00 *				
ECT8PRE	0.63 *	1.00 *			
ECT9PRE	0.54 *	0.58 *	1.00 *		
ECT10PRE	0.48 *	0.52 *	0.69 *	1.00 *	
ECT1PST	0.17	0.23	0.47 *	0.19	1.00 *
ECT2PST	0.23	0.16	0.19	0.09	0.51 *
ECT3PST	0.21	0.25	0.43 *	0.19	0.59 *
ECT4PST	0.38 *	0.32 *	0.50 *	0.44 *	0.56 *
ECT5PST	0.22	0.21	0.23	0.25	0.57 *
ECT6PST	0.24	0.24	0.35 *	0.31	0.45 *
ECT7PST	0.50 *	0.30	0.55 *	0.35 *	0.59 *
ECT8PST	0.39 *	0.57 *	0.53 *	0.32 *	0.44 *
ECT9PST	0.26	0.29	0.58 *	0.40 *	0.47 *
ECT10PST	0.48 *	0.35 *	0.43 *	0.49 *	0.35 *
GROUP	-0.17	0.02	-0.07	0.06	-0.37

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	ECT2PST	ECT3PST	ECT4PST	ECT5PST	ECT6PST
ECT2PST	1.00 *				
ECT3PST	0.17	1.00 *			
ECT4PST	0.40 *	0.66 *	1.00 *		
ECT5PST	0.48 *	0.25	0.59 *	1.00 *	
ECT6PST	0.28	0.57 *	0.55 *	0.32 *	1.00 *
ECT7PST	0.36 *	0.62 *	0.69 *	0.28	0.45 *
ECT8PST	0.28	0.42 *	0.44 *	0.15	0.46 *
ECT9PST	0.26	0.54 *	0.50 *	0.36 *	0.43 *
ECT10PST	0.27	0.62 *	0.60 *	0.32 *	0.47 *
GROUP	-0.42	-0.45	-0.42	-0.27	-0.28

* Significant at the .05 level.

PEARSON CORRELATION MATRIX

	ECT7PST	ECT8PST	ECT9PST	ECT10PST	GROUP
ECT7PST	1.00 *				
ECT8PST	0.35 *	1.00 *			
ECT9PST	0.63 *	0.31	1.00 *		
ECT10PST	0.71 *	0.39 *	0.72 *	1.00 *	
GROUP	-0.41	-0.00	-0.40	-0.35	1.00 *

* Significant at the .05 level.

PMMATPRE - Primary Measures of Music Audiation Tonal Pretest

PMMATPST - Primary Measures of Music Audiation Tonal Posttest

PMMARPRE - Primary Measures of Music Audiation Rhythmic Pretest

PMMARPST - Primary Measures of Music Audiation Rhythmic Posttest

PMT PRE - Pitch Matching Test Pretest

PMT PST - Pitch Matching Test Posttest

ECT PRE - Echo Clapping Test Pretest

ECT PST - Echo Clapping Test Posttest

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